



# Data Entry Guide for Key Category Analysis (KCA) Tool



**December 2024**



**EPA**

United States  
Environmental Protection  
Agency

# Data Entry Guide for the Key Category Analysis (KCA) Tool

## KCA Tool Version 3.0

United States Environmental Protection Agency

EPA-430-B-240-03

December 2024

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**EPA's Capacity Building for National Greenhouse Gas Inventories website:**  
<https://www.epa.gov/ghgemissions/capacity-building-national-greenhouse-gas-inventories>

## Acknowledgements

The Environmental Protection Agency would like to acknowledge the key individual and organizational contributors to this document and tool, without whose efforts this guide would not be complete.

Within EPA's Office of Atmospheric Protection (OAP), development of the key category analysis tool was led by Amanda Chiu, Mausami Desai, Yasmine Farhat, Keyle Horton, Christopher Sherry, and John Steller. Martin Wolf as an AAAS Science & Technology Policy Fellow hosted by the EPA Office of Air and Radiation, supported review of the guidance and tool.

We thank Abt Global for their technical support in developing the key category analysis tool, including Jason Goldsmith, Marissa Hoer, Matt Pasquali, and Olivia Salmon.

We thank the countries that volunteered their experts' time to review the key category analysis tool as potential users: María Lourdes Manrique, Eluney Deliens, and Macarena Maia Moreira Muzio from Argentina; Rumbidzai Mhunduru from South Africa; and Treina Dinoo Ramlochan from Trinidad and Tobago.

We thank Aether for providing support in reviewing and developing the key category analysis tool, including Rosie Brook and Justin Goodwin.

We thank Ricardo for providing support in reviewing the key category analysis tool, including Sina Wartmann.

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## Background

The U.S. Environmental Protection Agency (EPA) has developed tools 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 greenhouse gas (GHG) inventories using the [2006 Intergovernmental Panel on Climate Change Guidelines \(2006 IPCC Guidelines\)](#) and the [2019 Refinement of the 2006 IPCC Guidelines \(2019 Refinement\)](#) on a biennial basis.

The Key Category Analysis (KCA) Tool was developed by EPA to help facilitate the identification and reporting of sources and sinks that make the greatest contribution to national GHG emissions and removals. This analysis can help guide national GHG inventory teams in prioritizing improvements and associated allocation of resources to improve their national GHG inventory. This tool applies the guidance in the *2006 IPCC Guidelines*, Volume 1, Chapter 4 on Methodological Choice and Identification of Key Categories. 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 \(MPGs\)](#) for more information, but the requirements are noted in the introduction following this section. Countries may also use the *2019 Refinement*, which includes some updates for implementing the KCA (i.e. the trend analysis).

The concept of key categories was created 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.

This KCA Tool is a standalone tool and requires inventory data for at least two years (i.e., the Initial/Base<sup>1</sup> and Current Year<sup>2</sup> of the reported time series) to complete a KCA. This tool complements the [documentation template](#), which documents the sources and sinks that make the greatest contribution to national GHG emissions and removals and helps the National Inventory Coordinator (NIC) or the KCA lead in preparing their country’s national GHG inventory data for use in the KCA tool, for an inventory management system.

## Introduction to Version 3.0 of the KCA Tool

This is Version 3.0 of the KCA Tool. Version 3.0 includes functional improvements to the tool to make it more user-friendly, and methodological changes to align with the *2019 Refinement*. This tool provides a

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<sup>1</sup> The Initial/Base Year is the starting year for the national GHG inventory time series. See the MPGs for information on reporting requirements for time series, including start year (See Chapter II of Annex to 18 CMA.1).

<sup>2</sup> The Current Year is the most recent year included and compiled for the national GHG inventory. See the MPGs for information on time series reporting requirements, including requirements and flexibility in relation to latest reported year in time series (See Chapter II of Annex to 18 CMA.1).

way for countries to identify key categories under two approaches consistent with the IPCC guidelines: Approach 1 and Approach 2.

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”). Approach 1 key category assessment is completed without incorporating information on uncertainty. 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 (see Step 4 below to compile this information). 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). The analysis is performed with and without the LULUCF sector to understand its influence on overall GHG levels and trends. Reporting includes flexibilities for developing countries discussed further below.

#### **IPCC Inventory Software, ETF Reporting Tools, and KCA Tool**

If using the IPCC Inventory Software to compile the GHG Inventory, the KCA Tool within that software has the capability to compute the KCA based on the software-compiled GHG inventory. The ETF Reporting Tools also include functions to produce an Approach 1 KCA based on your reported inventory time series. The KCA Tool developed by EPA can be used as quality check of the KCA produced by the IPCC software or [ETF Reporting Tools](#), noting these tools produce a default Approach 1 level and trend analysis. The main difference with this tool is it allows for more customized disaggregation beyond the default disaggregation as compared to the IPCC Inventory Software and ETF reporting tools. The updated tool also includes a table summarizing categories reported as “NE” or not estimated for improvement planning, to allow for qualitative consideration of whether categories currently not estimated should be considered “key.”

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.

A level assessment is the absolute level of emissions and removals for a particular year of interest, while a trend assessment is used to identify categories that may not be large enough to be identified by the level assessment, but whose trend is significantly different from the trend of the overall inventory and should therefore receive particular attention.

Before beginning, 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 key category analysis. 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.<sup>3</sup>

## Tool Framework

The KCA Tool first requires users to enter background information and input data for each Common Reporting Table (CRT) sector. Based on the information and data provided by the user, the tool provides results in several output tables.

The tool uses shaded cells and colored tabs to help the user enter data and navigate the tool; Figure 1 provides a quick color reference guide. Data entry input cells are shaded **YELLOW** and uncertainty value input cells are shaded **ORANGE** throughout the tool.

The color of the KCA Tool tab indicates its purpose:

- The **LIGHT BLUE** tabs provide overview information and instructions on how to use the tool.
- The **DARK BLUE** tabs are for user input.
- The **BLUE** tabs summarize data entered into the **DARK BLUE** tabs and perform the key category analysis.
- The **ORANGE** tab provides a summary of all key categories.
- The **DARK GREY** tab provides a summary of categories with notation key(s) for each sector.
- The **BLACK** tabs provide a reference to the IPCC AR5 (Fifth Assessment) and IPCC AR6 (Sixth Assessment) global warming potential (GWP) values and a crosswalk of IPCC category codes with this tool.

**Figure 1. KCA Tool Colors Reference Guide**

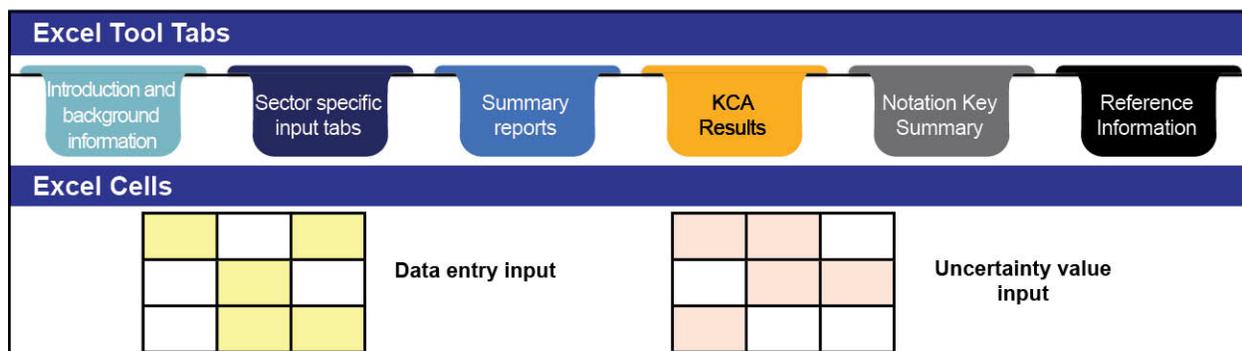
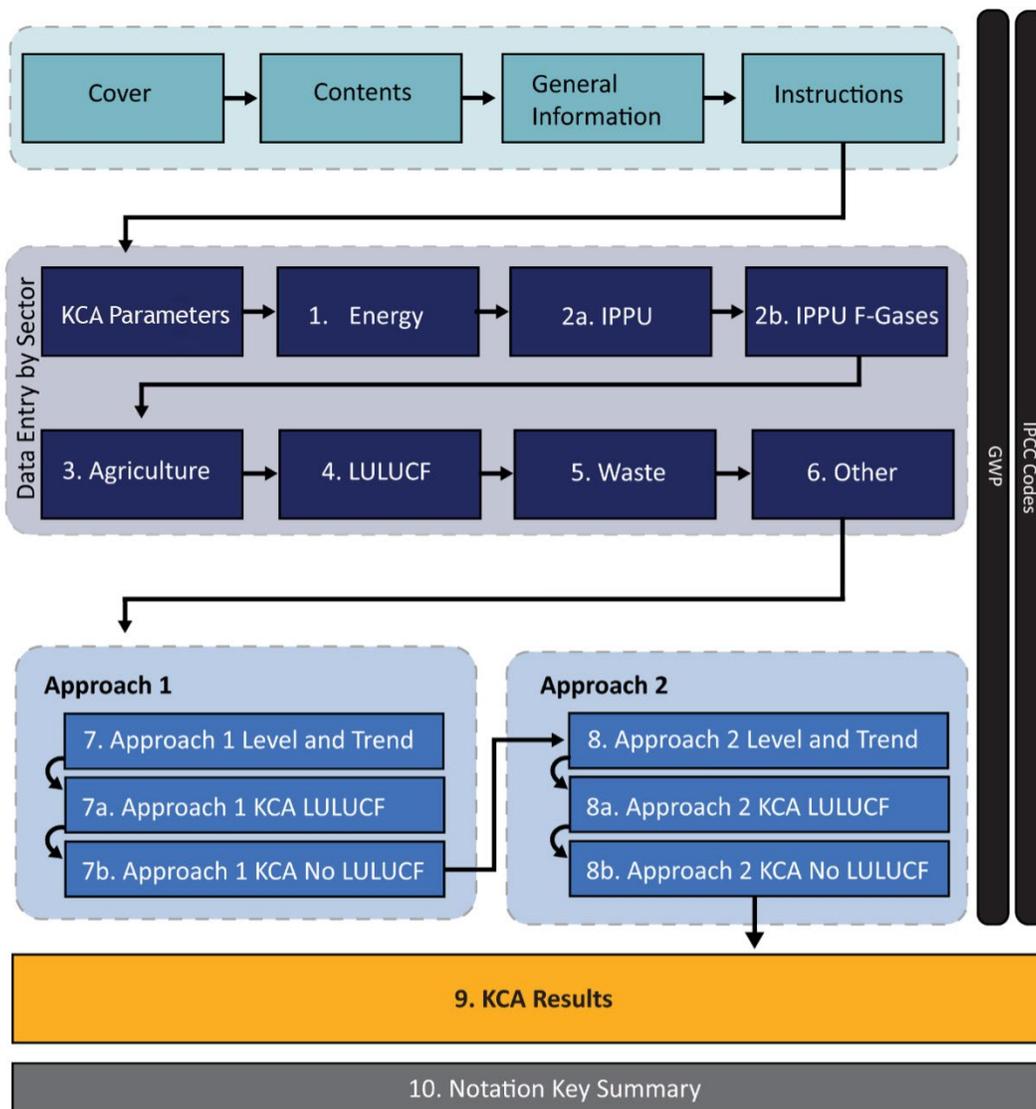


Figure 2 provides a flow chart for navigating through the tool. The top row shows the introductory and background information tabs, the middle row shows the data entry sector tabs, the third row shows the level and trend assessment, Approach 1, and Approach 2 tables. The IPCC category codes and global warming potential (GWP) tabs are included as references for the user. Detailed information on each of these KCA Tool tabs is provided in this document.

<sup>3</sup> 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.

Figure 2. Flow Chart of the KCA Tool



The KCA Tool begins with the **Cover** tab. This tab provides information on the version and date that the tool was last updated as well as tool support, contact information, and the EPA inventory capacity building website.

The **Contents** tab presents an overview of the tool's contents, includes brief descriptions of each tab, and provides direct links to each tab.

The **General Information** tab provides an overview of a key category analysis, links to relevant background information, and defines terms, acronyms, and the notation keys for **DARK BLUE KCA Input - Sector** data input tabs numbered 1 - 6.

The **Instructions** tab provides an overview of the steps needed to complete the key category analysis. Each data entry tab has a link at the top to easily navigate back to the Instructions tab (see Figure 3 for an example of where to find the **Instructions** tab link on each data entry tab).

Except for the **Cover** and **Reference** tabs, clickable 'Back' and 'Next' buttons are located on the top right of each sheet to easily navigate between tabs (Figure 3).

**Figure 3. KCA Tool Instructions Tab Link and Next/Back Button Example**

1. KCA Input - Energy		Back	Next
<b>Instructions</b>	Click the 'Instructions' shortcut link for a detailed, step by step on how to enter GHG category-level emissions and/or removals data. <i>Note: If additional categories or subcategories are included in a GHG inventory that are not already included in this tool, enter the CRT code, category title, and GHG in the blank rows at the end of the table.</i>		
<b>Notation Keys</b>	Click the 'Notation Keys' shortcut link to visit the 'General Information' tab for the complete list of notation keys and definitions. <i>Note: If you have an aggregated value it is still helpful to enter a notation key for the disaggregated categories for the qualitative summary.</i>		

## Tool Overview

The next sections of the Data Entry Guide walk users through detailed steps for selecting parameters and entering data to complete the key category analysis. Briefly, these steps are:

- Organize inventory data following the guidance in the *2006 IPCC Guidelines* section 4.2 of Chapter 4 to facilitate entry of data into the KCA Tool. Organizing inventory data by CRT sector, subsector, category, subcategory, gas, and year will facilitate your KCA, entry of data into this tool, and data entry into future ETF reporting tools. 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."

### Notes:

- An optional standalone [Data Entry Sheet](#) is provided to help users organize their inventory data. The Data Entry Sheet mirrors the **DARK BLUE KCA Input - Sector** data input tabs in the tool. The user may populate the Data Entry Sheet with their country's inventory data for every sector to facilitate populating or copying data to **DARK BLUE KCA Input - Sector** data input tabs in the tool.
- Do check that categories are not being double counted, (i.e. if including disaggregation of a category, do not include the category total emissions as well).
- Select the parameters of the KCA in the **KCA Parameters** tab. First, enter the Base Year<sup>1</sup> and Current Year<sup>2</sup>. Select the version of the IPCC Assessment Report you will use for GWP conversions (IPCC AR5 or IPCC AR6). Note that GWPs for the IPCC Fifth Assessment (AR5) are the default values for this tool and the GWPs for the IPCC Sixth Assessment (AR6) are included here for comparative purposes only. Next, select the KCA Threshold you will use for the Approach 1 Assessment (from 85% to 95%). Starting in 2024, with the first biennial transparency report (BTR), the GWP values in use should be AR5. Select the *2006 IPCC Guidelines* equation (2006 equation) or *2019 Refinement* equation (2019 equation) you will use for the trend assessment.
  - If activity was not occurring in Base Year (i.e., emissions and removals are zero in that year), or the first year of available data for a category is later than the selected Base Year, you can instead use the emissions/removals value from the first year when the activity started as the Base Year.

- 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, the trend assessment is the same as the level assessment.
- See the 2006 and 2019 equations in the **KCA Parameters** tab and the discussion in 'Step 3: Review Approach 1 and Approach 2 emissions and removals' later in this guide for more information.
- Enter GHG category-level emissions and/or removals data for the Base and Current Years by sector in **DARK BLUE KCA Input - Sector** data input tabs numbered 1- 6. In these tabs, data entry is required in the **YELLOW** shaded cells. Emissions and/or removals data can be entered in the bolded category rows (i.e., **Fuel Combustion – Energy Industries**) or a subcategory row (i.e., Fuel combustion – Energy Industries – Liquid Fuels), dependent on the available data disaggregation. If you have disaggregated data available to use in a subcategory row, please select "See Disaggregated" from the dropdown menu for the higher category row in the 'Base Year Estimates (kt)' and/or 'Current Year Estimates (kt)' columns. Then enter the disaggregated data in the subcategory rows below. If you start entry with aggregated data and realize later that you have disaggregated data you would like to use in a subcategory row, please be sure to change the aggregated row to "See Disaggregated" from the dropdown menu so as to not double count data values. The CRT codes are included in each of the **DARK BLUE KCA Input - Sector** data input tabs in the 'CRT Code' column (column B). See the crosswalk for IPCC and CRT codes in the **IPCC Codes** tab.<sup>4</sup>

If additional categories or subcategories are included in a GHG inventory that are not already included in this tool, enter the CRT code, category title, and GHG in the blank rows at the end of the table. Refer to the CRT tables to identify CRT codes, available here:

<https://unfccc.int/documents/311076>. Follow the instructions in the 'Data Source' box in each of the seven **DARK BLUE KCA Input - Sector** data input tabs to document the source of the data.

- For required data entry rows where you do not have data or are including data in a more disaggregated CRT category, enter a notation key (descriptions found in the **General Information** tab) for each category indicating why data are not reported for the Base Year and/or Current Year. If you have an aggregated value, it is still helpful to enter a notation key (e.g., included elsewhere (IE)) for the disaggregated categories for reporting a qualitative summary of KCA findings. Emissions and removals data for each gas must be entered in kilotons (kt) in the 'Base Year Estimates (kt)' and 'Current Year Estimates (kt)' columns.<sup>5</sup> The kt carbon dioxide equivalent (CO<sub>2</sub>e) will be automatically calculated based on this input. If data are considered confidential, consider reporting emissions at a higher level of aggregation (e.g., category instead of subcategory) in order to assess significance through the KCA and enter "C" as the notation key for lower levels of disaggregation. See below for special instructions regarding the 'Industrial Processes and Product Use (IPPU)' and 'Agriculture' sectors:

<sup>4</sup> Learn more about mapping of categories from CRT and *2006 IPCC guidelines* here: <https://unfccc.int/documents/634242>.

<sup>5</sup> Kt is the unit used in CRT and has been applied to this tool for consistency. Kt and Gigagram (Gg) are the same unit of measurement.

- For the 'IPPU' sector, there are two **DARK BLUE KCA Input - Sector** data input tabs, tabs 2a and 2b.
  - Enter data for the 'IPPU' sector into the **2a. KCA Input - IPPU** tab.
  - Use the **2b. KCA Input - IPPU F-gas** tab to enter all F-gas emissions reported in the 'IPPU' sector.
    - For CRT codes '2.F.6 Other Applications' and '2.H Other', select the gas from the dropdown menu in the 'Greenhouse Gas' column before entering emissions values.
    - Emissions data entered in the **2b. KCA Input - IPPU F-gas** tab are summed together and used in the **2a. KCA Input - IPPU** tab to summarize all emissions and/or removals in this sector.
    - There is a row under each industry to input an F-gas that is not listed. These rows are identified as '*Entry Optional*' to indicate that data entry here is not required. For these rows, enter the F-gas name in the 'Greenhouse Gas' column and enter the name of the F-gas and GWP of the gas into the tables on the **GWP** tab. ***If the F-gas and corresponding GWP are not entered in these tables, the emissions will not be calculated to CO<sub>2e</sub>.***
- For the 'Agriculture' sector, the **3. KCA Input - Agriculture** tab, there are additional rows under both Enteric Fermentation (3.A.4) and Manure Management (3.B.4) to enter 'other livestock' not captured by the categories listed. These rows are identified as '*Entry Optional*' to indicate that data entry here is not required. For these rows, only the name of the livestock has to be entered in the 'Category Title' column.
- Enter uncertainty values in the **ORANGE** shaded cells on the **DARK BLUE KCA Input - Sector** data input tabs. This optional information will provide the user with an Approach 2 assessment in addition to an Approach 1 KCA assessment. It is highly encouraged to complete an Approach 2 KCA assessment if uncertainty data are available. If uncertainty data are not available, leave all columns blank. Enter the uncertainty data (in % values – e.g., enter 5 for 5%, not 0.05) into the **ORANGE** shaded cells in the 'Activity Data Uncertainty' and/or 'Emission Factor Uncertainty' columns. Use the 'Combined Uncertainty' column if the user has one uncertainty percentage that accounts for both activity data and emissions factor data. Note that if the activity data and emission factor uncertainty reported are not the same value, the larger uncertainty value should be used. Uncertainty values will always be a positive number. See the "Uncertainty Values" section under "**Step 2: Enter Emissions and Removals Data and Uncertainty Values**" for more information on uncertainty.
- While entering GHG category-level emissions and/or removals data in the **DARK BLUE KCA Input - Sector** data input tab, view the 'Status Tracker' box at the top of tab to see how many remaining categories need data entry before proceeding to the next **DARK BLUE KCA Input - Sector** data input tab. These emissions data entered are used in the other worksheets to determine the key categories based on the level and trend assessment. Note that the **KCA Input – Other** tab does not have a Status Tracker as all entries on this input tab are optional.

- View summary reports in the **BLUE** tabs. These summary reports correspond to the data entered in the **DARK BLUE KCA Input – Sector** data input tabs, and also contain a summary of the Approach 1 Level and Trend assessments – and Approach 2 assessments, if applicable.
  - The **7. Approach 1 Level and Trend** tab provides a summary of tabs **7a. Approach 1 KCA LULUCF**, the analysis of Approach 1 Level and Trend Analysis including LULUCF, and **7b. Approach 1 KCA No LULUCF**, the analysis of Approach 1 Level and Trend Analysis excluding LULUCF. Key categories are shaded in **GREEN** for the threshold selected by the user and **LIGHT BLUE** for the 95% threshold.
  - The **8. Approach 2 Level and Trend** tab provides a summary of tabs **8a. Approach 1 KCA LULUCF**, the analysis of Approach 2 Level and Trend Analysis including LULUCF, and **8b. Approach 2 KCA No LULUCF**, the analysis of Approach 2 Level and Trend Analysis excluding LULUCF. Key categories are shaded in **LIGHT BLUE** up to the 90% threshold.
- View the **9. KCA Results** tab for a summary of key categories identified in tabs **7a, 7b, 8a,** and **8b.**
- View the **10. Notation Key Summary** tab for a summary of the categories that are not estimated for each sector.

#### **Tips**

- Definitions, acronyms, and additional resources are provided in the **General Information** tab.
- Links to the **Instructions** tab as well as definitions of each notation key are shown in **GREY** boxes at the top of each **DARK BLUE KCA Input - Sector** data input tab and at the beginning of key data input sections.
- Users have the option to break links from external data source files in the workbook application. To do so, users can click on 'Data' in the top ribbon>Queries & Connections>Workbook Links. The values are then hard pasted from the external source.<sup>6</sup>

## Step-by-Step Instructions for using the KCA Tool

The following Steps 1 - 6 provide detailed instructions to walk users through the process of selecting parameters and entering data into each tab on the KCA Tool to complete the Key Category Analysis.

### Step 1: Getting Started – Entering Key Parameters

The user input tabs are in **DARK BLUE**. Users begin by inputting or selecting key information in the **KCA Parameters** tab.

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<sup>6</sup> Data path specified corresponds to Microsoft 365 Excel Version 2410 and may be different for other versions of Excel.

In the **KCA Parameters** tab (Figure 4):

- Enter the Base Year and Current Year (see definitions in Appendix 1). The years entered in this tab are visible in the supplemental tabs as a reference.
- Select the version of the IPCC Assessment Report to use for GWP conversions.
- Select the KCA Threshold from the dropdown list to use for the Approach 1 Assessment. The KCA threshold is used to identify key categories that, when summed together in descending order of magnitude, add up to that percentage of the total level.

**Note on Reporting Years:**

*The latest reporting year should be no more than two years prior to the submission of a country's national inventory report. Developing countries have a flexibility provision for the latest year reported to be no more than three years prior to the submission year (e.g. if submitting report in 2024, latest inventory year if using flexibility would be 2021).*

In the Approach 1 methodology, key categories are identified using a pre-determined cumulative emissions threshold, where key categories are those that sum to 95 percent of the total level when summed together in descending order of magnitude.

Developing countries have the flexibility to identify key categories using a threshold between 85-95 percent, instead of the 95 percent threshold defined in the *2006 IPCC Guidelines*, allowing a focus on improving fewer categories and prioritizing resources. Under the MPGs, countries that apply this flexibility are required to clarify capacity constraints to using the higher threshold in their KCA and provide a self-determined estimated timeframe for improvements in relation to those constraints. The final list of key categories may change based on the selected threshold.

Users can select the equation to use for the trend assessment from either the *2006 IPCC Guidelines* or the *2019 Refinement*. One principal difference between the two equations is that the 2019 equation accommodates scenarios where emissions or removals were zero in the Base Year. If activity was not occurring in the Base Year (i.e., emissions and removals are zero in that year), users can also select the 2006 equation and apply the emissions/removals value from the first year when the activity started as the Base Year. If using the 2006 equation for the trend analysis and activity for a category was not occurring in the Base Year, the trend assessment is the same as the level assessment. If countries use the 2019 equation, they should clarify as part of documentation in their national inventory document why the 2019 equation is more appropriate for their national circumstances. See each equation below the key parameters table in the KCA Parameters tab and the discussion in Step 3 below for more information.

Once the Base and Current Years are entered and the GWP and KCA Threshold are selected, the Status Tracker box on the **KCA Parameters** tab will turn green, allowing you to click **Begin Data Entry** in the Status Tracker to begin the data entry process (see Figure 4).

Figure 4. KCA Tool “KCA Parameters” Tab

**Key Category Analysis Parameter Input** Back

This is the KCA Parameter Input worksheet. To start the Key Category Analysis, enter in all required input fields in the **YELLOW** shaded cells in the tables below.

- Enter the Base Year and Current Year in the 'Key Category Analysis Year' table below.
 

**Best Practice Tip:** The Current Year should be no more than two years prior to the submission of a country's national inventory report. Developing countries have the flexibility to instead have their latest reporting year as three years prior to the submission of their national inventory report.
- Select the version of the IPCC Assessment Report you will use for Global Warming Potentials by using the dropdown in the 'Global Warming Potentials (GWPs)' table below. Note that GWPs for the IPCC Fifth Assessment (AR5) are the default values for this tool and the GWPs for the IPCC Sixth Assessment (AR6) are included here for comparative purposes only.
- Select the KCA Threshold you will use for the Approach 1 Assessment. Developing countries have the flexibility to identify key categories using a threshold of 85% to 95%. Countries without this flexibility must select 95%.
- Select the 2006 or 2019 equation you will use for the trend assessment. If activity was not occurring in Base Year (i.e., emissions and removals are zero in that year), you can instead use the emissions/removals value from the first year when the activity started as the Base Year. If using the IPCC Equation 4.2 (2006) for the trend analysis and activity for a category was not occurring in the Base Year, the trend assessment is the same as the level assessment. See each equation below the key parameters table for more information.
- Once the Base and Current Years are entered and the Global Warming Potentials and KCA Threshold are selected, the 'Status Tracker' for this tab will turn green, allowing you to click "Begin Data Entry" to proceed to the first data entry tab.

Key Category Analysis Year		Global Warming Potentials (GWPs)	KCA Threshold	Trend Equation	Status Tracker
Enter Base Year	2022	Select 'IPCC AR5 (Fifth Assessment)' or 'IPCC AR6 (Sixth Assessment Report)' from drop-down menu below:	Select a threshold from the drop-down menu below:	Select the 2019 or 2006 trend assessment equation from the drop-down menu below:	<div style="background-color: #e0ffe0; padding: 5px; border: 1px solid #ccc;"> <a href="#" style="color: green; text-decoration: none;">Begin Data Entry</a> </div>
Enter Current Year	2024	IPCC AR5 (Fifth Assessment)	95%	Equation 4.2 (IPCC 2019)	

KCA Parameters | 1. KCA Input - Energy | 2a. KCA Input - IPPU | 2b. KCA Input - IPPU F-gas | 3. KCA Input - Agriculture | 4. KCA Input - LULU

## Step 2: Enter Emissions and Removals Data and Uncertainty Values

Enter emissions and/or removals data for categories within each sector in each of the seven **DARK BLUE KCA Input - Sector** data input tabs (see the flowchart in Figure 2 for a list of all **DARK BLUE KCA Input - Sector** data input tabs).

Optionally, users may enter any uncertainty values into the data input tabs.

Note the IPPU Sector is separated into two tabs – one for mostly non-fluorinated gases from this sector (**2a. KCA Input – IPPU**) and one specifically for fluorinated gas source categories (F-gases) (**2b. KCA Input – IPPU F-gas**).

Required data entry cells are shaded in **YELLOW**.

The uncertainty value cells are shaded in **ORANGE**. More information regarding uncertainty can be found in the ‘Uncertainty Values’ section below.

**Note on Tool Navigation**

Use the ‘Status Tracker’ above the input table to track the number of categories that still require data entry. A clickable ‘Next’ button will appear once data are entered in all required fields. Note that on the **DARK BLUE KCA Input – Other** tab does not have a Status Tracker as all entries on this input tab are optional.

Status Tracker	
Number of Categories Requiring Data Entry	0
Proceed to 2a. KCA Input - IPPU	Next

### ***Emissions and Removals Data Entry***

For each category, enter the emissions and/or removals data in kilotons (kt) into the ‘Base Year Estimates (kt)’ and ‘Current Year Estimates (kt)’ columns in the **DARK BLUE KCA Input - Sector** data input tabs. Dependent on the data disaggregation, emissions and/or removals data can be entered in the bolded category rows (i.e., **Fuel Combustion – Energy Industries**) or a subcategory row (i.e., Fuel combustion – Energy Industries – Liquid Fuels).

**Notation Keys and Definitions**

**NO (Not Occurring)** - For categories or processes, including recovery, under a particular source or sink category that do not occur within a Party.

**NE (Not Estimated)** - For activity data and/or emissions by sources and removals by sinks of GHGs that have not been estimated but for which a corresponding activity may occur within a Party.

**NA (Not Applicable)** - For activities under a given source/sink category that do occur within the Party but do not result in emissions or removals of a specific gas.

**IE (Included Elsewhere)** - For emissions by sources and removals by sinks of GHGs estimated but included elsewhere in the inventory instead of under the expected source/sink category.

**C (Confidential)** - For emissions by sources and removals by sinks of GHGs where the reporting would involve the disclosure of confidential information.

If you have disaggregated data available to use in a subcategory row, please select "See Disaggregated" from the dropdown menu (shown in Figure 5) for the higher category row in the 'Base Year Estimates (kt)' and/or 'Current Year Estimates (kt)' columns. Then enter the disaggregated data in the 'Base Year Estimates (kt)' and/or 'Current Year Estimates (kt)' columns in the subcategory rows below. If you start an entry with aggregated data and realize later that you have disaggregated data you would like to use in a subcategory row, please be sure to change the aggregated row to "See Disaggregated" from the dropdown menu to not double count data values.

Emissions entered in these columns will automatically convert to kt CO<sub>2</sub>e in the 'Base Year Estimates (kt CO<sub>2</sub>e)' and 'Current Year Estimates (kt CO<sub>2</sub>e)' columns using 100-year GWPs from the IPCC Assessment Report version selected in the **KCA Parameters** tab.<sup>7</sup> Note the MPGs require use of the 100-year GWPs from IPCC AR5 beginning in 2024 with the first BTR.

Figure 5. KCA Tool "1. KCA Input – Energy" Tab Showing "See Disaggregated" Dropdown Menu

Energy Sector					
	CRT Code	Category Title	Greenhouse Gas	Base Year Estimates (kt)	Current Year Estimates (kt)
Entry Required	1.A.1	Fuel Combustion - Energy Industries	CO <sub>2</sub>	See Disaggregated	
Entry Required	1.A.1	Fuel Combustion - Energy Industries	CH <sub>4</sub>		
Entry Required	1.A.1	Fuel Combustion - Energy Industries	N <sub>2</sub> O		
Entry Required	1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	CO <sub>2</sub>		
Entry Required	1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	CH <sub>4</sub>		
Entry Required	1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	N <sub>2</sub> O		
Entry Required	1.A.1	Fuel combustion - Energy Industries - Solid Fuels	CO <sub>2</sub>		
Entry Required	1.A.1	Fuel combustion - Energy Industries - Solid Fuels	CH <sub>4</sub>		

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<sup>7</sup> These GWP values come either from [Table 8.A.1](#) in the Fifth IPCC Assessment Report (AR5) or [Table 7.SM.7](#) from the Sixth IPCC Assessment Report (AR6), as indicated on the **GWP** tab.

If emissions or removals are not reported for a category, enter one of the five notation keys into the 'Base Year Estimates (kt)' and/or 'Current Year Estimates (kt)' columns. Within the KCA tool, the definitions of the five notation keys are located in a table on the [General Information](#) tab.

If a category does not have either emissions and/or removals reported or a notation key entered in the 'Base Year Estimates (kt)' and/or 'Current Year Estimates (kt)' columns, an '*Entry Required*' alert will be shown in the first column. Once data and/or a notation key are entered, the '*Entry Required*' alert will be removed.

Note that some rows in the **2b. KCA Input – IPPU F-gas** and **3. KCA Input – Agriculture** tabs indicate 'Entry Optional' in the first column. Entry for these rows is not required to complete the KCA.

For example, in Figure 6 the row for *1.A.1 Fuel Combustion - Energy Industries - Solid Fuels N<sub>2</sub>O* is left blank and the '*Entry Required*' alert is showing to the left. Once emissions are entered for the row *1.A.1 Fuel Combustion - Energy Industries - Solid Fuels N<sub>2</sub>O*, the '*Entry Required*' alert will be removed from the first column.

**Figure 6. KCA Tool "1. KCA Input – Energy" Tab Showing Where Data Entry is Required**

		Energy Sector			
CRT Code	Category Title	Greenhouse Gas	Base Year Estimates (kt)	Current Year Estimates (kt)	Base Year Estimates (kt CO <sub>2</sub> e)
1.A.1	Fuel Combustion - Energy Industries	CO <sub>2</sub>	See Disaggregated	See Disaggregated	See Disaggregated
1.A.1	Fuel Combustion - Energy Industries	CH <sub>4</sub>	See Disaggregated	See Disaggregated	See Disaggregated
1.A.1	Fuel Combustion - Energy Industries	N <sub>2</sub> O	See Disaggregated	See Disaggregated	See Disaggregated
	1.A.1 Fuel combustion - Energy Industries - Liquid Fuels	CO <sub>2</sub>	IE	50.0	IE
	1.A.1 Fuel combustion - Energy Industries - Liquid Fuels	CH <sub>4</sub>	202.0	15.0	5,656.0
	1.A.1 Fuel combustion - Energy Industries - Liquid Fuels	N <sub>2</sub> O			

*Entry Required* alert is shown in the first column for the row: 1.A.1 Fuel combustion - Energy Industries - Liquid Fuels (N<sub>2</sub>O).

### Uncertainty Values

If uncertainty values for a category are available, enter the uncertainty data (in % values – e.g., enter 5 for 5%, not 0.05) in the 'Activity Data Uncertainty' and 'Emission Factor Uncertainty' columns in the **DARK BLUE KCA Input - Sector** data input tabs. Country-specific values or default values from the *2006 IPCC Guidelines* can be used. Under the MPGs, all countries shall perform an uncertainty analysis. Those developing country Parties that need flexibility in the light of their capacities with respect to this provision have the flexibility to instead provide, at a minimum, a qualitative discussion of uncertainty for key categories. Applying additional guidance from the *2019 Refinement*, if the uncertainty values are asymmetrical (e.g., -10% lower bound, +20% upper bound), the larger uncertainty value should be used (e.g., ±20%)<sup>8</sup>.

If users instead have standalone combined uncertainty values representing both uncertainty in the activity data and the emissions factor – for example, those derived from expert judgement or based on direct emissions estimates – users should instead enter this value in the 'Combined Uncertainty' column. If users enter data into the 'Activity Data Uncertainty' and 'Emission Factor Uncertainty' columns, the 'Combined Uncertainty' column will turn grey with a crosshatch pattern to prevent multiple uncertainty value entries for a single category.

<sup>8</sup> [https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/1\\_Volume1/19R\\_V1\\_Ch03\\_Uncertainties.pdf](https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/1_Volume1/19R_V1_Ch03_Uncertainties.pdf)

If no uncertainty value is available for a category, please leave the uncertainty value cells blank. The Approach 1 key category assessment is completed without incorporating information on uncertainty. If no categories have an uncertainty value, the Approach 2 assessments will be left blank. If some categories have uncertainty values while other categories do not, only the categories that do include uncertainty values will contribute to the Approach 2 ‘Level Assessment with Uncertainty’ and ‘Relative Level Assessment with Uncertainty’ columns on the **8. Approach 2 Level and Trend, 8a. Approach 2 KCA LULUCF**, and **8b. Approach 2 KCA No LULUCF** tabs. While not required under the ETF, users are encouraged to perform and report on Approach 2 analyses where possible.

Figure 7 provides an example with values entered in the ‘Combined Uncertainty’ column for certain categories. For these rows, the ‘Activity Data Uncertainty’ and ‘Emission Factor Uncertainty’ columns have a grey crosshatch pattern. Similarly, where the ‘Activity Data Uncertainty’ and ‘Emission Factor Uncertainty’ columns have values entered for other categories, the ‘Combined Uncertainty’ column for those categories has the grey crosshatch pattern. Additionally, there are several categories that do not have uncertainty values provided and are left blank.

**Figure 7. KCA Tool “1. KCA Input – Energy” Tab Showing Uncertainty Values**

Energy Sector									
CRT Code	Category Title	Greenhouse Gas	Base Year Estimates (kt)	Current Year Estimates (kt)	Base Year Estimates (kt CO <sub>2</sub> e)	Current Year Estimates (kt CO <sub>2</sub> e)	Activity Data Uncertainty	Emission Factor Uncertainty	Combined Uncertainty
1.A.1	Fuel Combustion - Energy Industries	CO <sub>2</sub>	See Disaggregated	See Disaggregated	See Disaggregated	See Disaggregated			
1.A.1	Fuel Combustion - Energy Industries	CH <sub>4</sub>	See Disaggregated	See Disaggregated	See Disaggregated	See Disaggregated			
1.A.1	Fuel Combustion - Energy Industries	N <sub>2</sub> O	See Disaggregated	See Disaggregated	See Disaggregated	See Disaggregated			
1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	CO <sub>2</sub>	IE	50.0	IE	50.0			5%
1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	CH <sub>4</sub>	202.0	15.0	5,656.0	420.0			
1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	N <sub>2</sub> O	75.0	NA	19,875.0	NA			
1.A.1	Fuel combustion - Energy Industries - Solid Fuels	CO <sub>2</sub>	45.0	NA	45.0	NA	10%		
1.A.1	Fuel combustion - Energy Industries - Solid Fuels	CH <sub>4</sub>	C	C	C	C			
1.A.1	Fuel combustion - Energy Industries - Solid Fuels	N <sub>2</sub> O	12.0	54.0	3,180.0	14,310.0	7%	4%	
1.A.1	Fuel combustion - Energy Industries - Gaseous	CO <sub>2</sub>							

### Step 3: Review Approach 1 and Approach 2 Emissions and Removals

Once data are entered in all seven **DARK BLUE KCA Input - Sector** data input tabs, summary tables are provided in the **BLUE** tabs. Review Approach 1 and 2 level emissions in the **7. Approach 1 Level and Trend** and **8. Approach 2 Level and Trend** tabs. Emissions and/or removal data entered in the **DARK BLUE KCA Input - Sector** data input tabs populate these summary tabs. Each tab has two tables: *Table 7-1*, which summarizes the Approach Level and Trend Analysis including Land Use, Land-Use Change and Forestry (LULUCF), and *Table 7-2*, which summarizes the Approach Level and Trend Analysis excluding LULUCF. Make sure to scroll to the right in each tab to see the full tables.

The **7. Approach 1 Level and Trend** tab provides the level assessments for the Base Year and Current Year, as well as the trend assessment value. *Table 7-1* in this tab summarizes Approach 1 Level and Trend Analysis *including* LULUCF. For example, in Figure 8, the LULUCF categories (beginning with CRT Code 4, shown outlined in the red box) are included in *Table 7-1* in the tool.

Figure 8. KCA Tool “7. Approach 1 Level and Trend” Tab Showing Table 7-1, Which Includes LULUCF Categories

Table 7-1. Approach 1 Level (L1-LULUCF) and Trend Analysis		
CRT Code	Category Title	Greenhouse Gas
<b>Total</b>		
1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	CO2
1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	CH4
1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	N2O
1.A.1	Fuel combustion - Energy Industries - Solid Fuels	CO2
1.A.1	Fuel combustion - Energy Industries - Solid Fuels	N2O
1.A.1	Fuel combustion - Energy Industries - Peat	CO2
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CO2
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CH4
1.A.2	Fuel combustion - Manufacturing Industries and Construction	N2O
2.A.1	Cement Production	CO2
2.A.2	Lime Production	CO2
2.B.2	Nitric Acid Production	N2O
2.B.9	Fluorochemical Production	Aggregate F-gases
2.C.1	Iron and Steel Production	CO2
2.C.1	Iron and Steel Production	CH4
2.C.2	Ferroalloys Production	CO2
2.F.1	Refrigeration and Air conditioning	CO2
3.A.1.a.ii	Non-dairy Cattle	CH4
3.A.3	Swine	CH4
4.A.1.a	Forest land remaining forest land – biomass (above and below)	CO2
4.A.1.d	Forest land remaining forest land – soil (organic)	CO2

Table 7-2 in the 7. Approach 1 Level and Trend tab summarizes Approach 1 Level and Trend Analysis excluding LULUCF. In Figure 9 the LULUCF categories (beginning with CRT Code 4) are removed from Table 7-2 in the tool. The red boxes in Figures 8 and 9 show how the inclusion/exclusion of LULUCF categories can influence the key categories.

Figure 9. KCA Tool “7. Approach 1 Level and Trend” Tab Showing Table 7-2, Which Excludes LULUCF Categories

Table 7-2. Approach 1 Level (L1) and Trend Analysis		
CRT Code	Category Title	Greenhouse Gas
<b>Total</b>		
1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	CO2
1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	CH4
1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	N2O
1.A.1	Fuel combustion - Energy Industries - Solid Fuels	CO2
1.A.1	Fuel combustion - Energy Industries - Solid Fuels	N2O
1.A.1	Fuel combustion - Energy Industries - Peat	CO2
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CO2
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CH4
1.A.2	Fuel combustion - Manufacturing Industries and Construction	N2O
2.A.1	Cement Production	CO2
2.A.2	Lime Production	CO2
2.B.2	Nitric Acid Production	N2O
2.B.9	Fluorochemical Production	Aggregate F-gases
2.C.1	Iron and Steel Production	CO2
2.C.1	Iron and Steel Production	CH4
2.C.2	Ferroalloys Production	CO2
2.F.1	Refrigeration and Air conditioning	CO2
3.A.1.a.ii	Non-dairy Cattle	CH4
3.A.3	Swine	CH4
5.A	Solid Waste Disposal - Municipal Solid Waste Disposal	CH4
5.A	Solid Waste Disposal - Industrial Solid Waste Disposal	CH4

If uncertainty values are provided in the **DARK BLUE KCA Input - Sector** data input tabs, the **8. Approach 2 Level and Trend** tab (Figure 10) will provide the percentage of uncertainty in the total inventory as well as the trend uncertainty value. In the tables on the **8. Approach 2 Level and Trend** tab, the ‘Activity Data Uncertainty’, ‘Emission Factor Uncertainty’, and ‘Combined Uncertainty’ cells are automatically filled with information based on what was entered in the **DARK BLUE KCA Input - Sector** data input tabs. The ‘Total Uncertainty’ column streamlines these three uncertainty columns, so all uncertainty data are in one column. The **8a. Approach 2 KCA LULUCF** and **8b. Approach 2 KCA No LULUCF** tab only shows the ‘Total Uncertainty’ column.

**Figure 10. KCA Tool “8. Approach 2 Level and Trend” Tab, Showing Uncertainty Values in Table 8-1**

2-LULUCF) and Trend Analysis (T2-LULUCF) Including LULUCF										
Level Assessment (2018)	Level Assessment (2020)	Activity Data Uncertainty %	Emission Factor Uncertainty %	Combined Uncertainty %	Total Uncertainty %	Level Assessment (2018) with Uncertainty	Level Assessment (2020) with Uncertainty	Trend Assessment Value	Trend Assessment with Uncertainty	Contribution to the Trend
1.000	1.000					0.042	0.038	3.154	0.096	1.000
0.106	0.06	10%	0%	0%	10%	0.011	0.006	0.289	0.029	0.303
0.000	0.08	0%	0%	5%	5%	0.000	0.004	0.784	0.039	0.410
0.000	0.07	0%	0%	0%	0%	0.000	0.000	0.645	0.000	0.000
0.153	0.14	0%	15%	0%	15%	0.023	0.022	0.093	0.014	0.146
0.106	0.04	0%	0%	0%	0%	0.000	0.000	0.444	0.000	0.000
0.153	0.14	0%	0%	0%	0%	0.000	0.000	0.075	0.000	0.000
0.015	0.01	0%	0%	0%	0%	0.000	0.000	0.046	0.000	0.000
0.036	0.03	0%	0%	4%	4%	0.001	0.001	0.042	0.002	0.017
0.000	0.02	0%	0%	0%	0%	0.000	0.000	0.235	0.000	0.000
0.067	0.04	10%	0%	0%	10%	0.007	0.005	0.118	0.012	0.124
0.001	0.00	0%	0%	0%	0%	0.000	0.000	0.010	0.000	0.000
0.057	0.05	0%	0%	0%	0%	0.000	0.000	0.065	0.000	0.000
0.179	0.14	0%	0%	0%	0%	0.000	0.000	0.112	0.000	0.000
0.035	0.02	0%	0%	0%	0%	0.000	0.000	0.037	0.000	0.000
0.092	0.09	0%	0%	0%	0%	0.000	0.000	0.157	0.000	0.000

**Methodology & Equations for Approach 1 Level and Trend**

The Base Year Level Assessment and Current Year Level Assessment are calculated by dividing the absolute value of the emissions or removals for a category by the overall emissions or removals for a given assessment year.

The Trend Assessment Value is calculated using the equation selected by users in the **KCA Parameters** tab. Users can select either the equation from the *2019 Refinement* (Figure 11) or the *2006 IPCC Guidelines* (Figure 12). If activity was not occurring in the Base Year, then emissions and removals are zero in that year. If countries use the Trend Assessment Equation from the *2019 Refinement*, they should indicate use of the Trend Assessment Equation and why it is more appropriate for their national circumstances, which includes using the latest guidance to better capture the influence of categories on the overall inventory trend.

**Figure 11. 2019 Refinement – Equation 4.2 Trend Assessment (Approach 1)**

<b>EQUATION 4.2 (UPDATED)</b> <b>TREND ASSESSMENT (APPROACH 1)</b>	Where:
$T_{x,t} = \frac{E_{x,t} - E_{x,0}}{\sum_i E_{i,t} - \sum_i E_{i,0}}$	$T_{x,t}$ = trend assessment of source or sink category $x$ in year $t$ as compared to the base year (year 0) $E_{x,0}$ and $E_{x,t}$ = value of emission or removal estimate of source or sink category $x$ in year 0 and year $t$ $\sum_i E_{i,t}$ and $\sum_i E_{i,0}$ = total inventory estimates in years $t$ and 0, respectively for $i = 1, \dots, n$

Users have the option of using equation 4.2 in Chapter 4 of the *2006 IPCC Guidelines*, as shown in Figure 12. If activity was not occurring in the Base Year (i.e., emissions and removals are zero in that year), users can instead select the 2006 equation, which will use the emissions/removals value from the first year when the activity started as the Base Year.

**Figure 12. 2006 IPCC Guidelines – Equation 4.2 Trend Assessment (Approach 1)**

<b>EQUATION 4.2</b> <b>TREND ASSESSMENT (APPROACH 1)</b>	Where:
$T_{x,t} = \frac{ E_{x,0} }{\sum_y  E_{y,0} } \cdot \frac{\left[ \frac{(E_{x,t} - E_{x,0})}{ E_{x,0} } \right]}{\left[ \frac{(\sum_y E_{y,t} - \sum_y E_{y,0})}{\sum_y  E_{y,0} } \right]}$	$T_{x,t}$ = trend assessment of source or sink category $x$ in year $t$ as compared to the base year (year 0) $ E_{x,0} $ = absolute value of emission or removal estimate of source or sink category $x$ in year 0 $E_{x,t}$ and $E_{x,0}$ = real values of estimates of source or sink category $x$ in years $t$ and 0, respectively $\sum_y E_{y,t}$ and $\sum_y E_{y,0}$ = total inventory estimates in years $t$ and 0, respectively

### **Methodology & Equations for Approach 2 Level and Trend**

The Trend Assessment with Uncertainty is calculated by multiplying the Trend Assessment Value by the Total Uncertainty.<sup>9</sup> The tool calculates the contribution to the trend by dividing the Trend Assessment with Uncertainty for a category by the overall Trend Assessment with Uncertainty.

### **Step 4: Review Approach 1 and Approach 2 Level and Trend Assessments**

In tabs **7a. Approach 1 KCA LULUCF** and **7b. Approach 1 KCA No LULUCF**, key categories are summarized for Approach 1 Level and Trend assessments. For an Approach 1 assessment, key categories are those that add up to 95 percent when summed together, as defined in the *2006 IPCC Guidelines*. The ETF offers developing countries the flexibility to identify key categories using a threshold between 85-95 percent.<sup>10</sup> Note that the final list of key categories may change based on the selected threshold.

Key categories are shaded in **GREEN** based on the threshold selected in the **KCA Parameters** tab. When a lower threshold is used, additional categories up to the 95 percent threshold are shaded in **LIGHT BLUE**. Key categories are shown sorted largest to smallest. Due to rounding, some categories listed with 95 percent may not be shaded light blue and therefore are not considered key. Note that the cumulative total shown in the shaded cells may exceed the threshold value selected if the previous, second largest category's cumulative total does not meet or exceed the threshold value. For example, if a user elects to use an 85 percent threshold, the sum of the categories that get the user to the 85 percent threshold are

<sup>9</sup> See *2006 IPCC Guidelines*, Volume 1, Chapter 4, Equation 4.5

<sup>10</sup> Under the MPGs, countries that apply this flexibility are required to clarify capacity constraints to using the higher threshold in their KCA and provide a self-determined estimated timeframe for improvements in relation to those constraints.

key and shaded in **GREEN**. If the cumulative total for one category were to only reach 80 percent, the next category will be shaded in **GREEN** even if the cumulative total value is above 85 percent.

#### Approach 1 Level and Trend Assessments

The **7a. Approach 1 KCA LULUCF** tab includes the LULUCF sector. *Table 7a-1* identifies key categories for the Base Year, *Table 7a-2* identifies key categories for the Current Year, and *Table 7a-3* summarizes key categories from the trend assessment. Figure 13 shows an example of *Tables 7a-1* through *7a-3* with an 85 percent threshold.

The **7b. Approach 1 KCA No LULUCF** tab excludes the LULUCF sector. This exclusion provides required information on the level and trend assessment, without the influence of emissions and removals from the LULUCF sector, and can be compared to findings including LULUCF provided in *Tables 7a-1* through *7a-3*. *Table 7b-1* identifies key categories for the Base Year, *Table 7b-2* identifies key categories for the Current Year, and *Table 7b-3* summarizes key categories from the trend assessment. See the example in Figure 14. Consistent with the example above with **7a. Approach 1 KCA LULUCF** tab (Figure 13), an 85 percent threshold is used, the key categories are shaded in **GREEN** for the 85 percent threshold, and additional categories are shaded **LIGHT BLUE** up to the 95 percent threshold. Note that all LULUCF categories (beginning with CRT Code 4) are removed from these tables and the key categories differ from *Tables 7b-1* through *7b-3* in the **7a. Approach 1 KCA LULUCF** tab.

Figure 13. KCA Tool “7a. Approach 1 KCA LULUCF” Tab

Approach 1 - Level Assessment						
Table 7a-1. Base Year (2022)						
CRT Code	Category Title	Greenhouse Gas	Base Year Estimates kt CO <sub>2</sub> e	Level Assessment	Cumulative Total	Rank of Base Year Value Estimate
<b>Total</b>			<b>291,343</b>	<b>1.000</b>		
2.C.3	Aluminium Production	Aggregate F-gases	198,900.0	0.683	68.3%	1
3.A	Enteric Fermentation	CH4	28,000.0	0.096	77.9%	2
3.B	Manure Management	CH4	14,000.0	0.048	82.7%	3
5.A	Solid Waste Disposal	CH4	14,000.0	0.048	87.5%	4
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CH4	11,200.0	0.038	91.3%	5
2.B.9	Fluorochemical Production	Aggregate F-gases	7,800.0	0.027	94.0%	6
1.A.1	Fuel Combustion - Energy Industries	N2O	3,975.0	0.014	95.4%	7
2.B	Chemical Industry	CH4	3,360.0	0.012	96.5%	8
1.A.1	Fuel Combustion - Energy Industries	CH4	2,520.0	0.009	97.4%	9
1.A.3	Transport	CH4	1,400.0	0.005	97.9%	10

Approach 1 - Level Assessment						
Table 7a-2. Current Year (2024)						
CRT Code	Category Title	Greenhouse Gas	Current Year Estimates kt CO <sub>2</sub> e	Level Assessment	Cumulative Total	Rank of Current Year Value Estimate
<b>Total</b>			<b>227,396</b>	<b>1.000</b>		
2.C.3	Aluminium Production	Aggregate F-gases	145,860.0	0.641	64.1%	1
3.A	Enteric Fermentation	CH4	22,400.0	0.099	74.0%	2
3.B	Manure Management	CH4	13,720.0	0.060	80.0%	3
5.A	Solid Waste Disposal	CH4	12,600.0	0.055	85.6%	4
2.B.9	Fluorochemical Production	Aggregate F-gases	9,100.0	0.040	89.6%	5
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CH4	8,400.0	0.037	93.3%	6
1.A.1	Fuel Combustion - Energy Industries	N2O	3,710.0	0.016	94.9%	7
2.B	Chemical Industry	CH4	2,800.0	0.012	96.1%	8
1.A.1	Fuel Combustion - Energy Industries	CH4	2,240.0	0.010	97.1%	9
1.A.3	Transport	CH4	1,120.0	0.005	97.6%	10

Approach 1 - Trend Assessment							
Table 7a-3. Trend Assessment							
CRT Code	Category Title	Greenhouse Gas	Base Year Estimates (2022) kt CO <sub>2</sub> e	Current Year Estimates (2024) kt CO <sub>2</sub> e	Contribution to the Trend	Cumulative Total	Rank of Trend Estimate
<b>Total</b>			<b>291,343</b>	<b>227,396</b>	<b>1.000</b>		
2.C.3	Aluminium Production	Aggregate F-gases	198,900.0	145,860.0	80%	79.6%	1
3.A	Enteric Fermentation	CH4	28,000.0	22,400.0	8%	88.0%	2
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CH4	11,200.0	8,400.0	4%	92.2%	3
5.A	Solid Waste Disposal	CH4	14,000.0	12,600.0	2%	94.3%	4
2.B.9	Fluorochemical Production	Aggregate F-gases	7,800.0	9,100.0	2%	96.2%	5
2.B	Chemical Industry	CH4	3,360.0	2,800.0	1%	97.1%	6
1.A.1	Fuel Combustion - Energy Industries	CH4	2,520.0	2,240.0	0%	97.5%	7
1.A.3	Transport	CH4	1,400.0	1,120.0	0%	97.9%	8

Figure 14. KCA Tool “7b. Approach 1 KCA No LULUCF” Tab

Table 7b-1. Base Year (2022)						
CRT Code	Category Title	Greenhouse Gas	Base Year Estimates kt CO <sub>2</sub> e	Level Assessment	Cumulative Total	Rank of Base Year Value Estimate
Total			290,693	1.00		
2.C.3	Aluminium Production	Aggregate F-gases	198,900.0	0.68	68.4%	1
3.A	Enteric Fermentation	CH4	28,000.0	0.09	78.1%	2
3.B	Manure Management	CH4	14,000.0	0.04	82.9%	3
5.A	Solid Waste Disposal	CH4	14,000.0	0.04	87.7%	4
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CH4	11,200.0	0.03	91.5%	5
2.B.9	Fluorochemical Production	Aggregate F-gases	7,800.0	0.02	94.2%	6
1.A.1	Fuel Combustion - Energy Industries	N2O	3,975.0	0.01	95.6%	7
2.B	Chemical Industry	CH4	3,360.0	0.01	96.7%	8
1.A.1	Fuel Combustion - Energy Industries	CH4	2,520.0	0.009	97.6%	9
1.A.3	Transport	CH4	1,400.0	0.005	98.1%	10
3.C	Rice Cultivation	CH4	1,400.0	0.005	98.6%	11
1.A.1	Fuel Combustion - Energy Industries	CO2	1,000.0	0.003	98.9%	12
5.E	Other	CO2	700.0	0.002	99.2%	13
3.E	Prescribed burning of savannas	CH4	504.0	0.002	99.3%	14
2.C	Metal Production	CO2	500.0	0.002	99.5%	15

Table 7b-2. Current Year (2024)						
CRT Code	Category Title	Greenhouse Gas	Current Year Estimates kt CO <sub>2</sub> e	Level Assessment	Cumulative Total	Rank of Current Year Value Estimate
Total			226,847	1.00		
2.C.3	Aluminium Production	Aggregate F-gases	145,860.0	0.64	64.3%	1
3.A	Enteric Fermentation	CH4	22,400.0	0.09	74.2%	2
3.B	Manure Management	CH4	13,720.0	0.06	80.2%	3
5.A	Solid Waste Disposal	CH4	12,600.0	0.05	85.8%	4
2.B.9	Fluorochemical Production	Aggregate F-gases	9,100.0	0.04	89.8%	5
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CH4	8,400.0	0.03	93.5%	6
1.A.1	Fuel Combustion - Energy Industries	N2O	3,710.0	0.01	95.1%	7
2.B	Chemical Industry	CH4	2,800.0	0.01	96.4%	8
1.A.1	Fuel Combustion - Energy Industries	CH4	2,240.0	0.010	97.3%	9
1.A.3	Transport	CH4	1,120.0	0.005	97.8%	10
3.C	Rice Cultivation	CH4	1,120.0	0.005	98.3%	11
1.A.1	Fuel Combustion - Energy Industries	CO2	800.0	0.004	98.7%	12
5.E	Other	CO2	600.0	0.003	99.0%	13
3.E	Prescribed burning of savannas	CH4	560.0	0.002	99.2%	14
2.C	Metal Production	CO2	500.0	0.002	99.4%	15

Table 7b-3. Trend Assessment							
CRT Code	Category Title	Greenhouse Gas	Base Year Estimates (2022) kt CO <sub>2</sub> e	Current Year Estimates (2024) kt CO <sub>2</sub> e	Contribution to the Trend	Cumulative Total	Rank of Trend Estimate
Total			290,693	226,847	1.00		
2.C.3	Aluminium Production	Aggregate F-gases	198,900.0	145,860.000	80%	79.7%	1
3.A	Enteric Fermentation	CH4	28,000.0	22,400.000	80%	88.1%	2
1.A.2	Fuel combustion - Manufacturing Industries and Construction	CH4	11,200.0	8,400.000	40%	92.3%	3
5.A	Solid Waste Disposal	CH4	14,000.0	12,600.000	20%	94.4%	4
2.B.9	Fluorochemical Production	Aggregate F-gases	7,800.0	9,100.000	20%	96.4%	5
2.B	Chemical Industry	CH4	3,360.0	2,800.000	1%	97.2%	6
1.A.1	Fuel Combustion - Energy Industries	CH4	2,520.0	2,240.000	0%	97.6%	7
1.A.3	Transport	CH4	1,400.0	1,120.000	0%	98.0%	8
3.B	Manure Management	CH4	14,000.0	13,720.000	0%	98.5%	9
3.C	Rice Cultivation	CH4	1,400.0	1,120.000	0%	98.9%	10
1.A.1	Fuel Combustion - Energy Industries	N2O	3,975.0	3,710.000	0%	99.3%	11
1.A.1	Fuel Combustion - Energy Industries	CO2	1,000.0	800.000	0%	99.6%	12
5.E	Other	CO2	700.0	600.000	0%	99.7%	13
3.E	Prescribed burning of savannas	CH4	504.0	560.000	0%	99.8%	14
5.C	Incineration and Open Burning of Waste	CH4	420.0	364.000	0%	99.9%	15

**Approach 2 Level and Trend Assessments**

In the 8a. Approach 2 KCA LULUCF and 8b. Approach 2 KCA No LULUCF tabs, key categories are summarized for Approach 2 Level and Trend assessments. Key categories are shaded in LIGHT BLUE up to the 90 percent threshold. Per the 2006 IPCC Guidelines, for an Approach 2 level assessment, “the key categories are those that add up to 90 percent” when summed together. These key categories are sorted from largest to smallest. Due to rounding, some categories listed with 90 percent may not be

shaded LIGHT BLUE and therefore are not considered key. The 8a. Approach 2 KCA LULUCF tab includes the LULUCF sector. Table 8a-1 identifies key categories for the Base Year, Table 8a-2 identifies key categories for the Current Year, and Table 8a-3 summarizes key categories from the trend assessment. See the example in Figure 15.

Figure 15. KCA Tool “8a. Approach 2 KCA LULUCF” Tab

Table 8a-1. Base Year (2022)					
Base Year Estimates (kt CO <sub>2</sub> e)	Level Assessment	Total Combined Uncertainty	Level Assessment with Uncertainty	Relative Level Assessment with Uncertainty	Cumulative Total
647,084	1.000		0.003	1.000	
26,500.0	0.041	0.040	0.002	0.545	54%
5,656.0	0.009	0.050	0.000	0.145	69%
3,180.0	0.005	0.081	0.000	0.132	82%
4,228.0	0.007	0.050	0.000	0.109	93%
2,800.0	0.004	0.030	0.000	0.043	97%
2,222.0	0.003	0.020	0.000	0.023	100%
45.0	0.000	0.100	0.000	0.002	100%
100.0	0.000	0.020	0.000	0.001	100%
IE	0.000	0.000	0.000	0.000	100%
19,875.0	0.031	0.000	0.000	0.000	100%
55,594.0	0.086	0.000	0.000	0.000	100%
42,515.0	0.066	0.000	0.000	0.000	100%
1,515.0	0.002	0.000	0.000	0.000	100%
66,780.0	0.103	0.000	0.000	0.000	100%
67,280.0	0.104	0.000	0.000	0.000	100%
NA	0.000	0.000	0.000	0.000	100%
420.0	0.001	0.000	0.000	0.000	100%
2.0	0.000	0.000	0.000	0.000	100%

Table 8a-2. Current Year (2024)					
Current Year Estimates (kt CO <sub>2</sub> e)	Level Assessment	Total Combined Uncertainty	Level Assessment with Uncertainty	Relative Level Assessment with Uncertainty	Cumulative Total
420,295	1.000		0.007	1.000	
14,310.0	0.034	0.081	0.003	0.399	40%
55,456.0	0.132	0.020	0.003	0.384	78%
13,250.0	0.032	0.040	0.001	0.183	97%
1,400.0	0.003	0.030	0.000	0.015	98%
700.0	0.002	0.050	0.000	0.012	99%
420.0	0.001	0.050	0.000	0.007	100%
50.0	0.000	0.020	0.000	0.000	100%
50.0	0.000	0.000	0.000	0.000	100%
na	0.000	0.000	0.000	0.000	100%
NA	0.000	0.100	0.000	0.000	100%
51,515.0	0.123	0.000	0.000	0.000	100%
78,881.0	0.188	0.000	0.000	0.000	100%
NA	0.000	0.000	0.000	0.000	100%
35,510.0	0.084	0.000	0.000	0.000	100%
61,800.0	0.147	0.000	0.000	0.000	100%
45.0	0.000	0.000	0.000	0.000	100%
3,444.0	0.008	0.000	0.000	0.000	100%
1.0	0.000	0.000	0.000	0.000	100%

Table 8a-3. Trend Assessment					
Base Year Estimates (2020)	Current Year Estimates (2022)	Combined Uncertainty	Trend Assessment with Uncertainty	Relative Level Assessment with Uncertainty	Cumulative Total
647,084	420,295		1.000	1.000	
2,222.0	55,456.000	0.020	0.358	0.358	36%
3,180.0	14,310.000	0.081	0.301	0.301	66%
26,500.0	13,250.000	0.040	0.178	0.178	84%
5,656.0	420.000	0.050	0.088	0.088	92%
4,228.0	700.000	0.050	0.059	0.059	98%
2,800.0	1,400.000	0.030	0.014	0.014	100%
45.0	NA	0.100	0.002	0.002	100%
100.0	50.000	0.020	0.000	0.000	100%
IE	50.000	0.000	0.000	0.000	100%
19,875.0	na	0.000	0.000	0.000	100%
55,594.0	51,515.000	0.000	0.000	0.000	100%
42,515.0	78,881.000	0.000	0.000	0.000	100%
1,515.0	NA	0.000	0.000	0.000	100%
66,780.0	35,510.000	0.000	0.000	0.000	100%
67,280.0	61,800.000	0.000	0.000	0.000	100%
NA	45.000	0.000	0.000	0.000	100%
420.0	3,444.000	0.000	0.000	0.000	100%
2.0	1.000	0.000	0.000	0.000	100%

The **8b. Approach 2 KCA No LULUCF** tab excludes the LULUCF sector. *Table 8b-1* identifies key categories for the Base Year, *Table 8b-2* identifies key categories for the Current Year, and *Table 8b-3* summarizes key categories from the trend assessment. Like the **8a. Approach 2 KCA LULUCF** tab, key categories are shaded in **LIGHT BLUE** and sum to 90 percent. See the example in Figure 16. Note that all LULUCF categories (beginning with CRT Code 4) are removed from these tables and the key categories differ from *Tables 8a-1* through *8a-3* (as shown in Figure 15).

**Figure 16. KCA Tool “8b. Approach 2 KCA No LULUCF” Tab**

Table 8b-1. Base Year (2022)						Approach 2 - Level Asses
Base Year Estimates (kt CO <sub>2</sub> e)	Level Assessment	Total Combined Uncertainty	Level Assessment with Uncertainty	Relative Level Assessment with Uncertainty	Cumulative Total	
<b>641,918</b>	<b>1.000</b>		<b>0.003</b>	<b>1.000</b>		
26,500.0	0.041	0.040	0.002	0.543	54%	
5,656.0	0.009	0.050	0.000	0.143	69%	
3,180.0	0.005	0.081	0.000	0.132	82%	
4,228.0	0.007	0.050	0.000	0.109	93%	
2,800.0	0.004	0.030	0.000	0.043	97%	
2,222.0	0.003	0.020	0.000	0.023	100%	
45.0	0.000	0.100	0.000	0.002	100%	
100.0	0.000	0.020	0.000	0.001	100%	
IE	0.000	0.000	0.000	0.000	100%	
19,875.0	0.031	0.000	0.000	0.000	100%	
55,594.0	0.087	0.000	0.000	0.000	100%	
42,515.0	0.066	0.000	0.000	0.000	100%	
1,515.0	0.002	0.000	0.000	0.000	100%	
66,780.0	0.104	0.000	0.000	0.000	100%	
67,280.0	0.105	0.000	0.000	0.000	100%	

Table 8b-2. Current Year (2024)						
Current Year Estimates (kt CO <sub>2</sub> e)	Level Assessment	Total Combined Uncertainty	Level Assessment with Uncertainty	Relative Level Assessment with Uncertainty	Cumulative Total	
<b>409,902</b>	<b>1.000</b>		<b>0.007</b>	<b>1.000</b>		
14,310.0	0.035	0.081	0.003	0.399	40%	
55,456.0	0.135	0.020	0.003	0.384	78%	
13,250.0	0.032	0.040	0.001	0.183	97%	
1,400.0	0.003	0.030	0.000	0.015	99%	
700.0	0.002	0.050	0.000	0.012	99%	
420.0	0.001	0.050	0.000	0.007	100%	
50.0	0.000	0.020	0.000	0.000	100%	
50.0	0.000	0.000	0.000	0.000	100%	
na	0.000	0.000	0.000	0.000	100%	
NA	0.000	0.100	0.000	0.000	100%	
51,515.0	0.126	0.000	0.000	0.000	100%	
78,881.0	0.192	0.000	0.000	0.000	100%	
NA	0.000	0.000	0.000	0.000	100%	
35,510.0	0.087	0.000	0.000	0.000	100%	
61,800.0	0.151	0.000	0.000	0.000	100%	

Table 8b-3. Trend Assessment						
Base Year Estimates (2020)	Current Year Estimates (2022)	Combined Uncertainty	Trend Assessment with Uncertainty	Relative Level Assessment with Uncertainty	Cumulative Total	
<b>641,918</b>	<b>409,902</b>		<b>1.000</b>	<b>1.000</b>		
2,222.0	55,456.000	0.020	0.358	0.358	36%	
3,180.0	14,310.000	0.081	0.301	0.301	66%	
26,500.0	13,250.000	0.040	0.178	0.178	84%	
5,656.0	420.000	0.050	0.088	0.088	92%	
4,228.0	700.000	0.050	0.059	0.059	97%	
2,800.0	1,400.000	0.030	0.014	0.014	100%	
45.0	NA	0.100	0.002	0.002	100%	
100.0	50.000	0.020	0.000	0.000	100%	
IE	50.000	0.000	0.000	0.000	100%	
19,875.0	na	0.000	0.000	0.000	100%	
55,594.0	51,515.000	0.000	0.000	0.000	100%	
42,515.0	78,881.000	0.000	0.000	0.000	100%	
1,515.0	NA	0.000	0.000	0.000	100%	
66,780.0	35,510.000	0.000	0.000	0.000	100%	
67,280.0	61,800.000	0.000	0.000	0.000	100%	

### Step 5: Review Key Categories

The **9. KCA Results** tab provides a summary of all key categories from tabs 7 and 8. A layout of the **9. KCA Results** tab is provided in Figure 17. A category can be considered a key category for a total of 12

unique assessments under Approach 1 and Approach 2, as summarized in the following tables. Refer to Figure A-1 for further information on Approaches and Levels.

**Figure 17. KCA Tool “9. Key Results” Tab Layout**

Approach 1						
Base Year ( )		Current Year ( )		Trend Assessment		
Assessment	Base Year Level 1 Assessment <b>with</b> LULUCF	Base Year Level 1 Assessment <b>without</b> LULUCF	Current Year Level 1 Assessment <b>with</b> LULUCF	Current Year Level 1 Assessment <b>without</b> LULUCF	Trend 1 Assessment <b>with</b> LULUCF	Trend 1 Assessment <b>without</b> LULUCF
Shorthand	L1 LULUCF	L1 No LULUCF	L1 LULUCF	L1 No LULUCF	T1 LULUCF	T1 No LULUCF
Approach 2						
Base Year ( )		Current Year ( )		Trend Assessment		
Assessment	Base Year Level 2 Assessment <b>with</b> LULUCF	Base Year Level 2 Assessment <b>without</b> LULUCF	Current Year Level 2 Assessment <b>with</b> LULUCF	Current Year Level 2 Assessment <b>without</b> LULUCF	Trend 2 Assessment <b>with</b> LULUCF	Trend 2 Assessment <b>without</b> LULUCF
Shorthand	L2 LULUCF	L2 No LULUCF	L2 LULUCF	L2 No LULUCF	T2 LULUCF	T2 No LULUCF

Each key category assessment approach has its own column. If a category is considered key for one of the key category assessments, the rank of the category for that assessment populates. These ranks can be found in the tables from [tabs 7a, 7b, 8a, and 8b](#). The KCA Threshold is populated from the [KCA Parameters](#) tab. On the [9. KCA Results](#) tab, there is a link to allow users to return to the [KCA Parameters](#) tab and select another threshold value to see which categories are considered key under an alternate KCA threshold (see Figure 18).

**Figure 18. Threshold Values Reference Box from KCA Tool “9. KCA Results” Tab**

<b>KCA Threshold</b>	Return to the 'KCA Parameters' worksheet to change the KCA Threshold and see which key categories are identified using an alternate threshold.	<b>Return to KCA Parameters Below:</b>
95%		<a href="#">KCA Parameters</a>

Figure 19 shows an example of *Table 9-1* from the [9. KCA Results](#) tab. In Figure 19, *2.B.2 – Nitric Acid Production – N<sub>2</sub>O* category is a key category under all 12 possible key category assessments. For the Base Year Level 1 Assessment without LULUCF, this category ranks first. Alternatively, *4.A.1 – Forest Land Remaining Forest Land - CO<sub>2</sub>* category is only a key category for a single Approach 2 key category assessment with LULUCF.

Figure 19. KCA Tool "9. KCA Results" Tab

Table 9-1. Key Categories Summary Table													
Key Categories	Identification Criteria												
	Approach 1						Approach 2						
	Base Year (2020)		Current Year (2022)		Trend Assessment		Base Year (2020)		Current Year (2022)		Trend Assessment		
	L1 LULUCF	L1 No LULUCF	L1 LULUCF	L1 No LULUCF	L1 LULUCF	T1 No LULUCF	L2 LULUCF	L2 No LULUCF	L2 LULUCF	L2 No LULUCF	L2 LULUCF	T2 No LULUCF	
1.A.1 - Fuel Combustion - Energy Industries - Gaseous Fuels - CO2													
2.B.2 - Nitric Acid Production - N2O	1	1	2	2	1	1	1	1	3	3	1	1	
2.B.5 - Carbide Production - CH4			3	3	3								
3.A.1 - Cattle - CH4	3	3	4	4			3		2	2	3		
3.A.3 - Swine - CH4			5										
4.A.1 - Forest Land Remaining Forest Land - CO2									5				
4.A.2 - Land Converted to Forest Land - CO2									4				
5.D - Wastewater Treatment and Discharge - Industrial - N2O	2	2	1	1	2	2	2	2	1	1	2	2	

### Step 6: Review Notation Key Summary

A list of all categories with notation keys for each sector is displayed in **10. Notation Key Summary**. Scroll through each table to see which categories have notation keys. Use the filtered columns to filter by Sector, CRT Code, Category, Gas, Base Year, and Current Year. If a category is not currently estimated (NE), based on national circumstances, compilers should consider if it should be key from a qualitative perspective. The following examples are given by the *2006 IPCC Guidelines* and *2019 Refinement* as considerations for qualitatively determining key categories:

- **No quantitative assessment of uncertainty.** Where Approach 2 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.** 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.
- **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.

See the example **10. Notation Key Summary** tab in Figure 20.

**Figure 20. KCA Tool “10. Notation Key Summary” Tab**

10. Notation Key Summary						Back
<p><b>Instructions:</b> This worksheet provides a summary of all categories with notation keys for each sector. Scroll through the table to see which categories have notation keys. Use the filtered columns to filter by Sector, CRT Code, Category, Gas, Base Year, and Current Year. If a category is not currently estimated (NE), consider it key from a qualitative perspective.</p>						
Table 10-1. Categories with Notation Keys						
Sector	CRT Code	Category	Gas	Base Year (2020)	Current Year (2022)	
Energy	1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	CO2	IE	-	
Energy	1.A.1	Fuel combustion - Energy Industries - Liquid Fuels	N2O	-	na	
Energy	1.A.1	Fuel combustion - Energy Industries - Solid Fuels	CO2	-	NA	
Energy	1.A.1	Fuel combustion - Energy Industries - Solid Fuels	CH4	C	C	
Energy	1.A.1	Fuel combustion - Energy Industries - Gaseous Fuels	CO2	NE	NE	
Energy	1.A.1	Fuel combustion - Energy Industries - Gaseous Fuels	CH4	NE	NE	
Energy	1.A.1	Fuel combustion - Energy Industries - Gaseous Fuels	N2O	NE	NE	
Energy	1.A.1	Fuel combustion - Energy Industries - Other Fossil Fuels	CO2	NE	NE	
Energy	1.A.1	Fuel combustion - Energy Industries - Other Fossil Fuels	CH4	NE	NE	
Energy	1.A.1	Fuel combustion - Energy Industries - Other Fossil Fuels	N2O	NE	NE	
Energy	1.A.1	Fuel combustion - Energy Industries - Peat	CH4	NA	NA	
Energy	1.A.1	Fuel combustion - Energy Industries - Peat	N2O	NO	NO	
Energy	1.A.1	Fuel combustion - Energy Industries - Peat	CH4	IE	IE	
Energy	1.A.1	Fuel combustion - Energy Industries - Biomass	N2O	IE	IE	
IPPU	2.A.2	Lime Production	CO2	-	NA	
IPPU	2.A.3	Glass Production	CO2	C	C	
IPPU	2.C.1	Iron and Steel Production	CO2	NA	-	
IPPU	2.E	Electronics Industry	CF4	NE	NE	
Agriculture	3.A.1.a.i	Dairy Cattle	CH4	NE	NE	
Agriculture	3.B.1.a.ii	Non-dairy Cattle	CH4	C	C	
LULUCF	4.A.1.c	Forest land remaining forest land – soil (mineral)	CO2	IE	IE	
Waste	5.A	Solid Waste Disposal - Industrial Solid Waste Disposal	CH4	NE	-	

## Additional Information

There are two **BLACK** tabs at the end of the tool that provide additional information.

The **GWP** tab provides the 100-year GWP values from Table 8.A.1 in Appendix 8.A of Chapter 8 in the *IPCC Working Group I Fifth Assessment Report*<sup>11</sup> and Table 7.SM.7, located in Chapter 7 in the *IPCC Working Group I Sixth Assessment Report*.<sup>12</sup>

At the bottom of each of the GWP tables, there are five yellow rows to enter any additional gases and GWP values not captured in the tables. Use the links to IPCC reports table to identify the correct GWP to use for any additional gas.

The **IPCC Codes** tab provides a crosswalk of key category codes found in the *2006 IPCC Guidelines* (consistent with Vol. 1, Chapter 4, Table 4.1 excluding special considerations)<sup>13</sup> and the CRT codes used in version 3.0 of the KCA tool.

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<sup>11</sup> [https://archive.ipcc.ch/pdf/assessment-report/ar5/wg1/drafts/WG1AR5\\_SOD\\_Ch08\\_All\\_Final.pdf](https://archive.ipcc.ch/pdf/assessment-report/ar5/wg1/drafts/WG1AR5_SOD_Ch08_All_Final.pdf)

<sup>12</sup> [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_Chapter07\\_SM.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter07_SM.pdf)

<sup>13</sup> Volume 1, Chapter 4, Table 4.1 of the *2006 IPCC Guidelines* suggests a level of aggregation for KCA. <https://www.ipcc-nggip.iges.or.jp/public/2006gl/>

## Appendix 1: Reference Information

Figure A-1 provides a table of definitions of terms used throughout the tool that is also provided on the **General Information** tab in the KCA Tool.

*Figure A-1. Definitions Table from the KCA Tool “General Information” Tab*

Term	Definition
Approach 1	The key category analysis is completed without incorporating uncertainties in emissions factor or activity data.
Approach 2	The key category analysis is completed <i>with</i> uncertainties in emissions factor or activity data.
Base Year	The starting year for the national GHG inventory time series. See the MPGs for information on reporting requirements for time series, including start year (See Chapter II of Annex to 18 CMA.1).
Current Year	Emissions for the most recent year that the national GHG inventory was compiled. See the MPGs for information on time series reporting requirements, including requirements and flexibility in relation to the latest reported year in time series (See Chapter II of Annex to 18 CMA.1).
Estimates	In the context of this tool, estimates refer to both emissions and removals.
Key Category	A key category is one that is prioritized within the national inventory system because its 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. Whenever the term <i>key category</i> is used, it includes both source and sink categories.
Level Assessment	A level assessment is the absolute level of emissions/removals for a particular year of interest. Any country that has developed a greenhouse gas inventory can perform an Approach 1 Level Assessment to identify the categories whose level has a significant effect on total national emissions and removals. Any country that has developed a greenhouse gas inventory AND has information on uncertainty values can perform an Approach 2 Level Assessment to identify the categories whose level has a significant effect on total national emissions and removals.
Trend Assessment	The purpose of the trend assessment is to identify categories that may not be large enough to be identified by the level assessment, but whose trend is significantly different from the trend of the overall inventory, and should therefore receive particular attention. The trend assessment identifies categories with trends that are different from the trend of the total inventory, regardless of whether the category trend is increasing or decreasing, or is a sink or source.

Figure A-2 provides a list of acronyms used throughout the tool that is also provided on the **General Information** tab in the KCA Tool.

**Figure A-2. Acronym Table from KCA Tool “General Information” Tab**

Acronym	Definition
BTR	Biennial transparency report
CRT	Common Report Tables
Gg	Gigagram
GHG	Greenhouse gas
GL	Guidelines
GWP	Global warming potential
IPCC	Intergovernmental Panel on Climate Change
KCA	Key Category Analysis
Kt	Kilotons
LULUCF	Land Use, Land-Use Change and Forestry
MPG	Modalities, Procedures, and Guidelines

Figure A-3 provides the notation key acronym and definition table that is also provided on the **General Information** tab in the KCA Tool. Notation keys are used in the **DARK BLUE KCA Input - Sector** data input tabs if emissions or removals are not reported for a category. More information on the **DARK BLUE KCA Input - Sector** data input tabs are discussed under *Step 2: Enter Emissions and Removals Data and Uncertainty Values* in this Data Entry Guide.

**Figure A-3. Notation Key Table from KCA Tool “General Information” Tab**

Notation Keys for KCA Input – Sector Data Input Tabs 1-6	Definition
NO (Not Occurring)	For categories or processes, including recovery, under a particular source or sink category that do not occur within a Party.
NE (Not Estimated)	For activity data and/or emissions by sources and removals by sinks of GHGs that have not been estimated but for which a corresponding activity may occur within a Party.
NA (Not Applicable)	For activities under a given source/sink category that do occur within the Party but do not result in emissions or removals of a specific gas.
IE (Included Elsewhere)	For emissions by sources and removals by sinks of GHGs estimated but included elsewhere in the inventory instead of under the expected source/sink category.
C (Confidential)	For emissions by sources and removals by sinks of GHGs where the reporting would involve the disclosure of confidential information. If emissions are considered confidential, consider reporting emissions at a higher level of aggregation (e.g., category instead of sub-category) in order to assess significance through the Key Category Analysis.

**For more information on notation keys, see Chapter II of Annex to 18 CMA.1.**