

Sectoral **A**ctivity data for **G**reenhouse gas **E**missions calculations (**SAGE**)

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One of the biggest problems we are facing is DATA

Before calculating emissions, we need to obtain ACTIVITY DATA, which means:

The category (2006 IPCC, CRF)

Where the data come from (the source reference), when it was collected, and by whom

The level of aggregation/coverage (national, or covering an island, a province etc..)

Data values and units of measurement

The uncertainty

Additional parameters that affect emission calculations from fuels:

Density

Calorific value

Carbon content

Water content

Were the data reviewed and approved? By whom? When? Were there any comments?

How do we deal with data gaps?

What about data analysis? Building indicators for NDCs and policy reports?

Daily life of a compiler

SAGE

Voila!

✓ Activity Data are well-organized, referenced and kept safely



✓ Uncertainties assigned inline with 2006 IPCC GLs ±5% ±10%

✓ Gaps filled



✓ Units converted kt TJ 10⁶m³

✓ Data Analysis done, Indicators built



✓ Data are IPCC-ready



SOS!!!

Uncertainty ???!!!

Barrels → TJ???

PDF

WELCOME TO SAGE Introduction



Welcome to SAGE Tool site

Sectoral Activity data for Greenhouse gas Emissions calculations (SAGE) is a data collect

Purpose

SAGE is a greenhouse gas inventory data collection tool to support national climate measurement, reporting, and verification (MRV) systems, especially in developing countries, through robust data collection, intelligent processing, and storage.

SAGE is fully compatible with the 2006 IPCC guidelines for national greenhouse gas inventories and was developed to support governments in collecting activity data to ultimately meet the reporting requirements under the Enhanced Transparency Framework of the Paris Agreement.

Features

SAGE provides an intuitive and user-friendly interface for collecting and documenting data to achieve transparent, accurate, consistent, comparable, and complete GHG inventories.

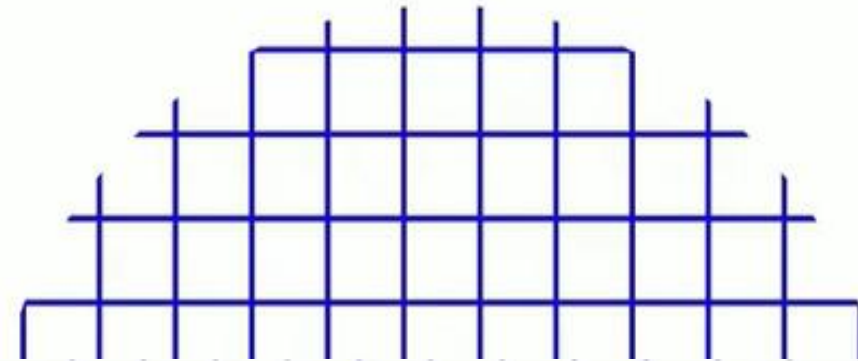
Key features include:

- Conveniently record data in the database with basic data validation
- Collate activity data, keep track of data origins and uncertainties
- Flexible selection options for entering fuels, technologies, etc. - they can be tailored to reflect national circumstances
- Support decision making on selecting optimal strategies for

Features

- Configuration tables adjustable at the country level
- Aligned with 2006 IPCC Guidelines
- Excel import/export
- Units conversion
- Detailed User guidance
- Cater for different user groups
- Web-based or can be installed on the intranet
- SAGE video tour
- Coverage: the Energy sector

What does SAGE do?...



**Enter & Track Activity
Data (AD)**

Recalculate units

Set uncertainty following
2006 IPCC logic

Apply top-down approach



**Find & Fill
Data gaps**



**Adjust menus
to national
circumstances**



**Perform
Data
analysis**

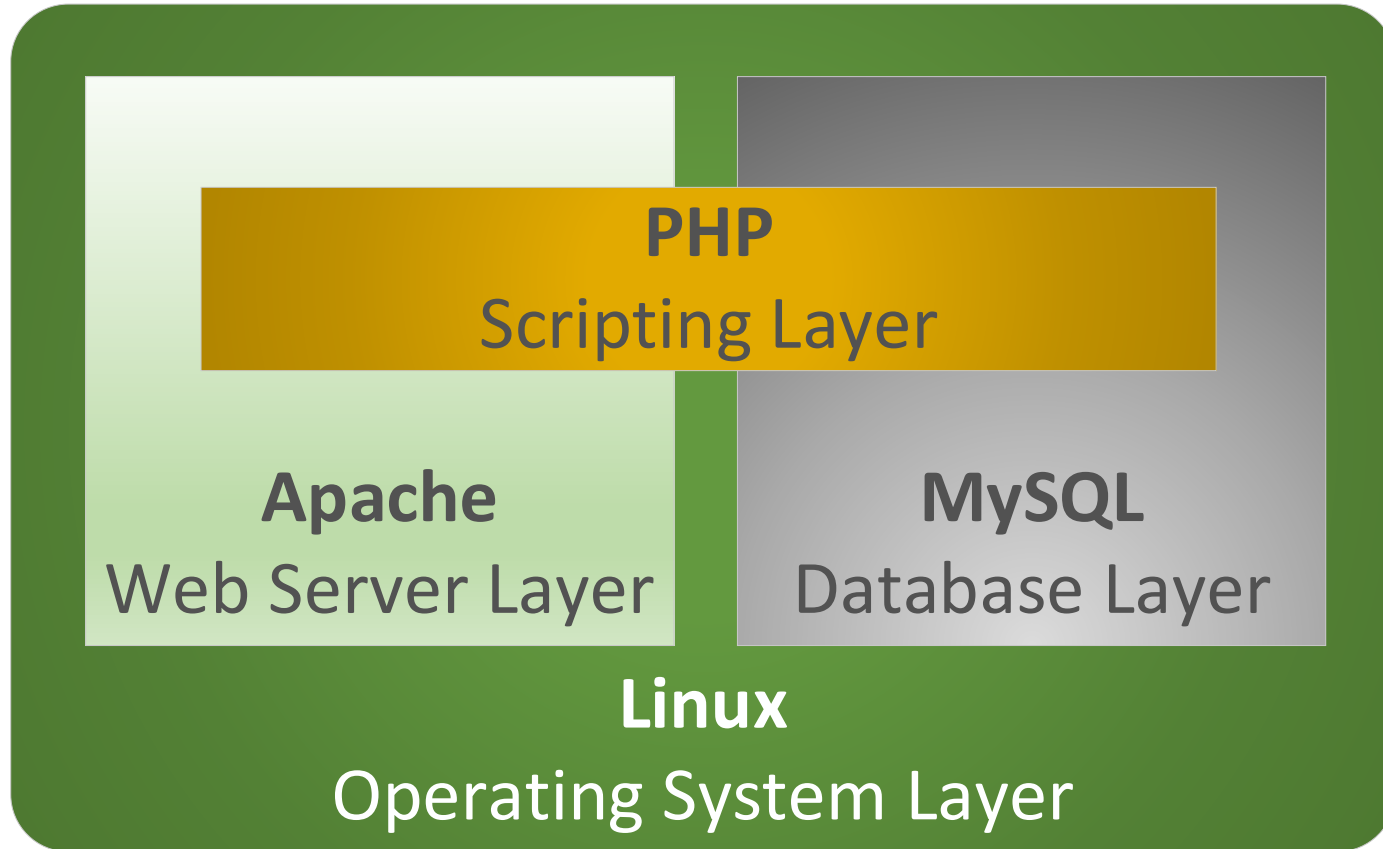


**Calculate
Indicators**



**Support data
Review &
approval process**

Inside the SAGE tool



For calculations, SAGE uses:

- business logic described in the 2006 IPCC Guidelines,
- basic material science and engineering,
- statistical formulae.



Global navigation links for a quick switch between components (visible in each screen)

Welcome to SAGE - please select one of the pages below:

Administration

Configuration

AD Collections

Analytic

Data Gaps

Functional components in SAGE

*Navigation links
for the currently
selected
functional
component*

AD Collections

Dashboard

Explore

Edit annual AD (72)

Manage all (77)

Draft (72)

Review (2)

Approve (2)

Publish (1)

Explore - Time-series AD collection

[Time-series AD collection](#) | [Annual AD collection](#) | [Annual AD](#) | [Info](#)

Explore Time-series AD collection

[<<](#) [<](#) [>](#) [>>](#) show records, starting from # (total 10) [Search](#) [Clear](#)

Time-series AD collection ↓	years range	state	Annual AD	records	categories
<input type="text"/>		<input type="text"/>			
Uncertainty_2000-2005	2000-2005	draft	6	166	5
Test_2000-2010	2000-2010	draft	11	151	8
RA_National_2000-2010	2002-2010	draft	9	27	1
My Inventory_1990-2020	2018-2018	approve	1	0	0
My Inventory_1990-2020	2020-2020	draft	1	0	0
My Inventory_1990-2020	2019-2019	review	1	0	0
GAPS_TEST_RA_National_2000-2010	2000-2010	draft	11	77	1

How to?

Adjust to the national
circumstances

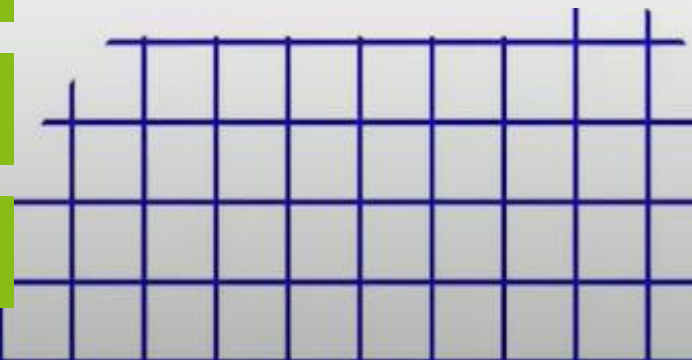
Administration

Configuration

AD Collections

Analytic

Data Gaps




















Configuration tables define the **list of options** in menus

The screenshot shows the Sage Sectoral Activity data for GHG Emissions interface. The top navigation bar includes the Sage logo, a home icon, a 'Switch to' dropdown, and several menu items: 'Analytic', 'Data Gaps', 'AD Collections', 'Configuration', 'Olia', 'Logout', and 'Reset'. The left sidebar contains navigation options: 'AD Collections', 'Dashboard', 'Explore', 'Edit annual AD (72)', 'Manage all (77)', 'Draft (72)', 'Review (2)', 'Approve (2)', and 'Publish (1)'. The main content area is titled '1.A.[1,2,4,5] - A1_2015-2021/2021 (A1_2021) - Add'. Below the title are buttons for 'List', 'Add', 'Export', 'Import', 'History', and 'Info'. The 'Add' button is highlighted. Below the buttons, the 'ID' is '49/100000000' and the 'Category' is '1.A.[1,2,4,5] - A1_2015-2021/2021 (A1_2021) - Add'. A dropdown menu is open, showing a list of options for 'Source'. The options are: 'Select', '1.A.1 - Energy Industries', '1.A.1.a - Main Activity Electricity and Heat Production', '1.A.1.a.i - Electricity Generation', '1.A.1.a.ii - Combined Heat and Power Generation (CHP)', '1.A.1.a.iii - Heat Plants', '1.A.1.b - Petroleum Refining', '1.A.1.c - Manufacture of Solid Fuels and Other Energy Industries', '1.A.1.c.i - Manufacture of Solid Fuels', '1.A.1.c.ii - Other Energy Industries', '1.A.2 - Manufacturing Industries and Construction', '1.A.2.a - Iron and Steel', '1.A.2.b - Non-Ferrous Metals', '1.A.2.c - Chemicals', '1.A.2.d - Pulp, Paper and Print', '1.A.2.e - Food Processing, Beverages and Tobacco', '1.A.2.f - Non-Metallic Minerals', '1.A.2.g - Transport Equipment', '1.A.2.h - Machinery', and '1.A.2.i - Mining (excluding fuels) and Quarrying'. Below the dropdown, there is a 'Source:' label and a dropdown menu with 'Select' as the current value. Below that, there is a 'Date issued:' label and a text input field with the placeholder 'yyyy-mm-dd'.

List Add Export Import Changes Info

<< > >> show 30 records, starting from # 1 (total 98) Search Clear

	id	ipcc code ↑	unfccc code	suffix	2006 IPCC name	status	
						Any ▾	
	90	1.A	1.A		Fuel Combustion Activities	enabled	✗
	93	1.A.1	1.A.1		Energy Industries	enabled	✗
	187	1.A.1.a	1.A.1.a		Main Activity Electricity and Heat Production	enabled	✗
	95	1.A.1.a.i	1.A.1.a.i		Electricity Generation	enabled	✗
	96	1.A.1.a.ii	1.A.1.a.ii		Combined Heat and Power Generation (CHP)	enabled	✗
	97	1.A.1.a.iii	1.A.1.a.iii		Heat Plants	enabled	✗
	98	1.A.1.b	1.A.1.b		Petroleum Refining	enabled	✗
	99	1.A.1.c	1.A.1.c		Manufacture of Solid Fuels and Other Energy Industries	enabled	✗
	100	1.A.1.c.i	1.A.1.c.i		Manufacture of Solid Fuels	enabled	✗
	101	1.A.1.c.ii	1.A.1.c.iii		Other Energy Industries	enabled	✗
	102	1.A.2	1.A.2		Manufacturing Industries and Construction	enabled	✗
	103	1.A.2.a	1.A.2.a		Iron and Steel	enabled	✗
	104	1.A.2.b	1.A.2.b		Non-Ferrous Metals	enabled	✗
	105	1.A.2.c	1.A.2.c		Chemicals	enabled	✗
	106	1.A.2.d	1.A.2.d		Pulp, Paper and Print	enabled	✗
	107	1.A.2.e	1.A.2.e		Food Processing, Beverages and Tobacco	enabled	✗
	108	1.A.2.f	1.A.2.f		Non-Metallic Minerals	enabled	✗

How to?

Create & Manage
AD Collections

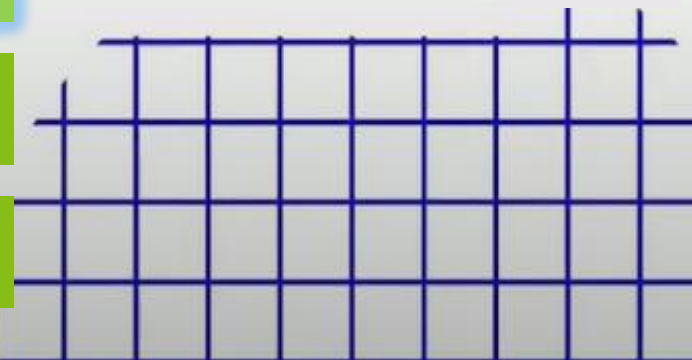
Administration

Configuration

AD Collections

Analytic

Data Gaps



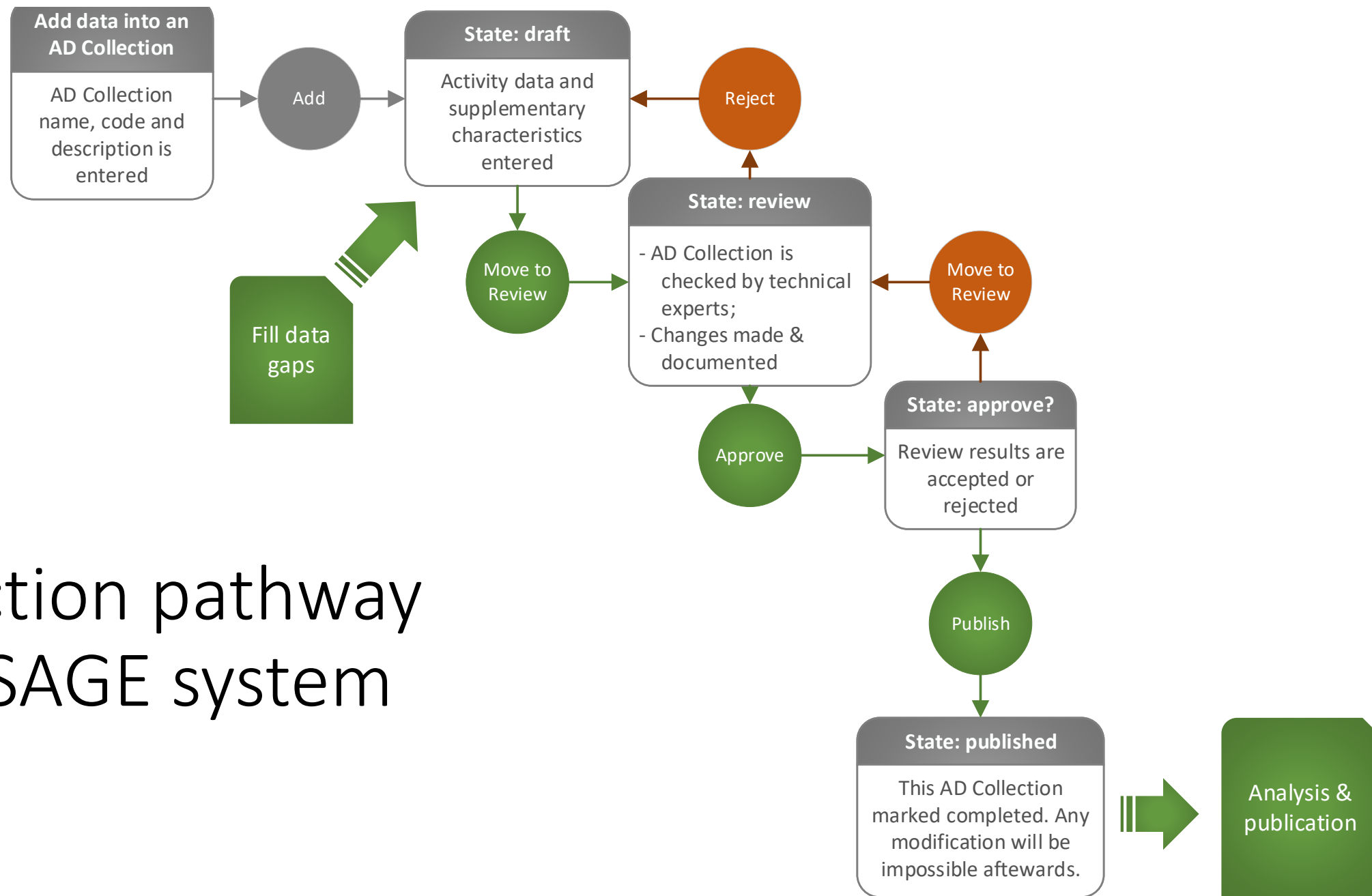
Functions

- View all available AD collections & records
- Create and manage annual AD Collections and time-series AD collections
- Enter & modify AD Collection data
- Separate Reference and Sectoral approach entries for fuel combustion data
- Support data approval process through draft/review/approve/publish states
- Import/Export data from/to Excel (CSV)

Edit annual AD (72) - List

Showing from # (total 65)

	code	description	num of records	begin date	closing date
10/RA_National-2000), 2000, closing 2022-01-15, records 0 ▾				<input type="text" value=""/> + <input type="text" value=""/>	<input type="text" value=""/> + <input type="text" value=""/>
	1.A.[1,2,4,5] St.Combustion ▾	1.A.[3,5] Transport ▾	1.B.[1,2] Fugitive ▾		
10/RA_National-2001), 2001, closing 2022-01-15, records 0 ▾				<input type="text" value=""/> + <input type="text" value=""/>	<input type="text" value=""/> + <input type="text" value=""/>
	1.A.[1,2,4,5] St.Combustion ▾	1.A.[3,5] Transport ▾	1.B.[1,2] Fugitive ▾		
10/RA_National-2002), 2002, closing 2022-01-15, records 0 ▾				<input type="text" value=""/> + <input type="text" value=""/>	<input type="text" value=""/> + <input type="text" value=""/>
	1.A.[1,2,4,5] St.Combustion ▾	1.A.[3,5] Transport ▾	1.B.[1,2] Fugitive ▾		
10/RA_National-2003), 2003, closing 2022-01-15, records 0 ▾				<input type="text" value=""/> + <input type="text" value=""/>	<input type="text" value=""/> + <input type="text" value=""/>
	1.A.[1,2,4,5] St.Combustion ▾	1.A.[3,5] Transport ▾	1.B.[1,2] Fugitive ▾		
10/RA_National-2004), 2004, closing 2022-01-15, records 0 ▾				<input type="text" value=""/> + <input type="text" value=""/>	<input type="text" value=""/> + <input type="text" value=""/>
	1.A.[1,2,4,5] St.Combustion ▾	1.A.[3,5] Transport ▾	1.B.[1,2] Fugitive ▾		



AD collection pathway through SAGE system

AD entry

Using SAGE form, recommended for a single year or for small corrections:

Create the AD collection

Go to relevant category group

Use ADD option

Fill in the form

Add

Using Excel template, recommended for a time-series:

Create the AD collection

Go to relevant category group

Download the template

Fill in the template for the time series

Upload the file to SAGE

Using the previous time-series AD Collection, recommended for editing time-series:

Create the AD collection

Go to existing AD collection that you want to use as a base

Export selected AD Collection

Modify exported data as required

Upload the file to SAGE

AD Collections

- Dashboard
- Explore
- Edit annual AD (72)**
- Manage all (77)
- Draft (72)
- Review (2)
- Approve (2)
- Publish (1)

1.A.[1,2,4,5] - A1_2015-2021/2018 (A1_2018) - 941

List Add Export Import History Info 941

ID: 51/941

Category:

1.A.1.a - Main Activity Electricity and Heat Production

Aggregation:

National

Statistics quality:

Unknown

Fuel:

Natural Gas

Fuel consumption: 1.0000 TJ : NA

Fuel properties

Density: 0.7240 kg/m3 : default - NA

Calorific value: 48.0000 TJ/Gg : default - NA

Carbon content: 15.3000 kg/kJ : default - NA

Water content: (empty)

Tier:

T1

Uncertainty details [Set from default](#) :

Uncertainty: 10.0000 % : default - modeled

Uncertainty max(for range only): (empty)

Calculated

Fuel mass: 0.0208 kt

Energy: 1.0000 TJ

Form data entry example

Review & Approve AD Collection

sage Sectoral Activity data for GHG Emissions

Switch to Analytic Data Gaps AD Collections Configuration Olia Logout Reset

Manage all (77) - A1_2015-2021/2021 (A1_2021) - A1_2015-2021

List Add History Info **A1_2015-2021**

ID: 49

Last edition details: 2021-02-26 14:43:37 (state 'draft') by Olia Admin (UNFCCC Data Collection Agency)

Time-series AD collection code:
A1_2015-2021

Year:
2021

AD collection approach:
Sectoral

Name:
A1_2015-2021

Description:
The activity data entry is complete. The collection is ready for a technical review. Reviewer: Olia Glade; Review time 1 August - 1 September 2021

Open for editing from:
2021-01-23

To:
2021-05-01

State:
draft (Activity data in draft [collection, edit] state)

Status:
enabled

Edition subject:
Data entry complete

Edition details:
The energy sector (1.A.3.a Aviation)

Save Delete Cancel **Move to review**

REVIEW Annual AD Collection

AD Collections

Dashboard

Explore

Edit annual AD (72)

Manage all (77)

Draft (72)

Review (2)

Approve (2)

Publish (1)

Manage all (77) - List

[List](#) |
 [Add](#) |
 [History](#) |
 [Info](#) |
 [A1_2015-2021](#)

[<<](#) |
 [<](#) |
 [>](#) |
 [>>](#)
 show records, starting from # (total 1)
 [Search](#) |
 [Clear](#)

	id ↑	Time-series AD collection	year	approach	description	rec.	begin date	closing date	state	status
	<input type="text"/>	<input type="text" value="A1"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>		<input type="text"/> + <input type="text"/>	<input type="text"/> + <input type="text"/>	<input type="text" value="review"/>	<input type="text" value="Any"/>
	54	A1_2015-2021	2015	sectoral	aa	0	2021-01-23	2021-05-01	review	enabled



AD Collection sent for REVIEW

AD Collections

Dashboard

Explore

Edit annual AD (72)

Manage all (77)

Draft (72)

Review (2)

Approve (2)

Publish (1)

Review (2) - A1_2015-2021/2015 (A1_2015) - A1_2015-2021

List History Info **A1_2015-2021**

ID: 54

Last edition details: 2021-03-16 14:48:03 (state 'review') by Alexander Admin (UNFCCC Data Collection Agency)

Time-series AD code: A1_2015-2021

Year: 2015

AD collection approach: Sectoral

Name: A1_2015-2021

Code: A1_2015

Description: aa

Begin date: 2021-01-23

Closing date: 2021-05-01

State: review

Edition subject:

the review is complete

Edition details:

The Reviewer confirms that the found errors have been corrected and recommends the AD Collection A1_2015-2021_2015 for approval

Cancel

Reject

Approve

Submit Annual AD Collection for approval

- [📁 AD Collections](#)
- [🏠 Dashboard](#)
- [🔍 Explore](#)
- [✎ Edit annual AD \(72\)](#)
- [✎ Manage all \(77\)](#)**
- [📄 Draft \(72\)](#)
- [📄 Review \(2\)](#)
- [📄 Approve \(2\)](#)
- [📄 Publish \(1\)](#)

Manage all (77) - List

[List](#) [Add](#) [History](#) [Info](#) [A1_2015-2021](#)

[<<](#) [<](#) [>](#) [>>](#) show records, starting from # (total 1) [Search](#) [Clear](#)

	id ↑	Time-series AD collection	year	approach	description	rec.	begin date	closing date	state	status
	<input type="text" value="13"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>		<input type="text"/> + <input type="text"/>	<input type="text"/> + <input type="text"/>	<input type="text" value="approve"/>	<input type="text" value="Any"/> ▼
	13	A2	2021	sectoral	1.A.1 category only	5	2020-12-22	2021-01-08	approve	enabled



How to?

Analyse data

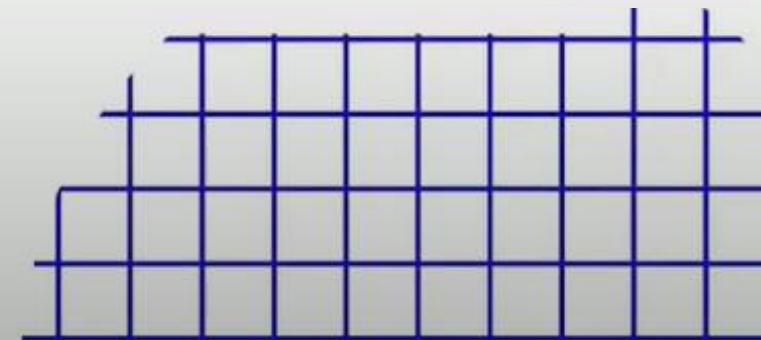
Administration

Configuration

AD Collections

Analytic

Data Gaps



Functions

- Calculate total AD values for all selected categories and fuels
- Build historical trend for selected categories and fuels
- Rank AD by category (for fuel consumption, in TJ)
- Rank by fuel combusted (for fuel consumption, in TJ)
- AD change between any two years
- Intensity Indicator calculations (e.g., fuel consumption per person)

1.A 1.B.1.a Coal 1.B.2.a Oil 1.B.2.b Gas Info

Data categories: (1.A.3.a.ii 1.A.3.b.i.1)

Fuels: (all)

AD inventory:

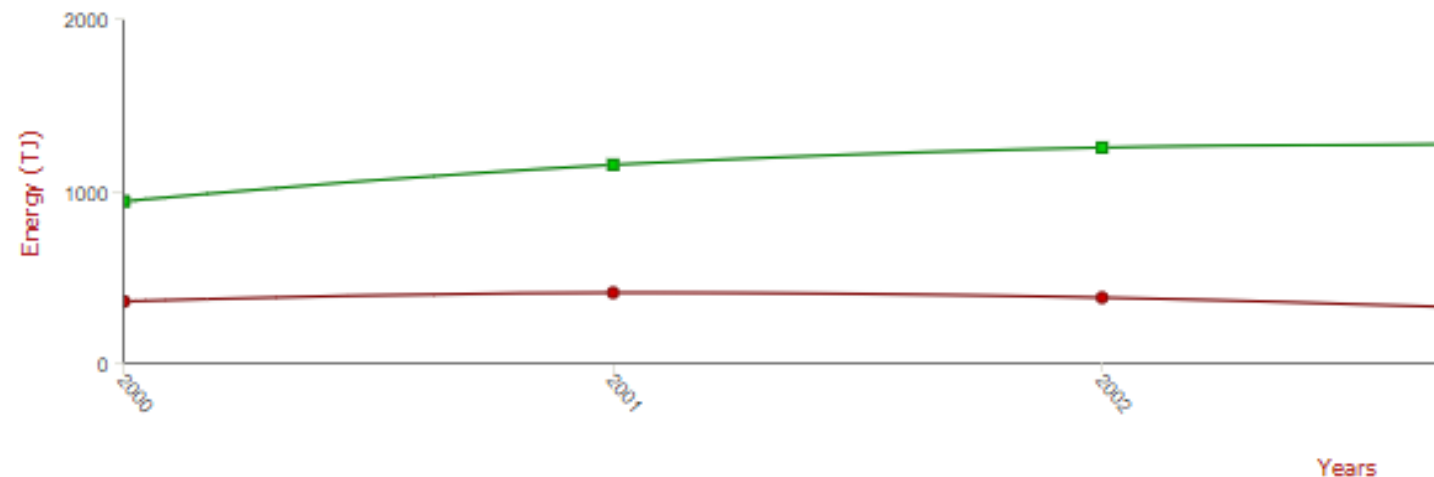
ENTRY_TEST_2000-2005

Years (leave empty for all):

2000-2005

Trend:

ipcc/year	2000	2001	2002	2003	2004	2005
1.A.3.a.ii	364.27	414.89	386.25	315.18	308.67	322.51
1.A.3.b.i.1	946.34	1,158.75	1,258.71	1,299.77	1,484.41	1,493.16



1.A.3.a.ii 1.A.3.b.i.1

How to?

Find and Fill Data Gaps

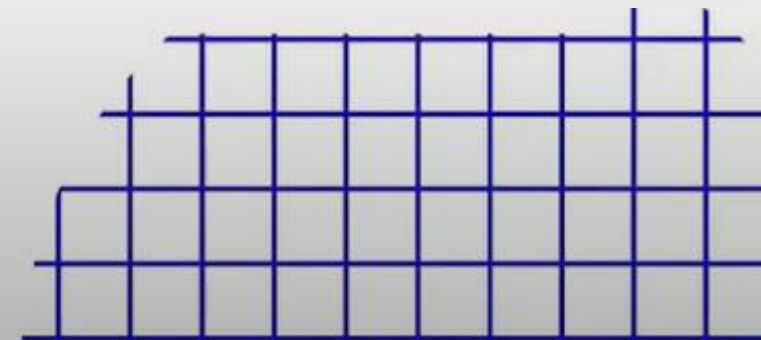
Administration

Configuration

AD Collections

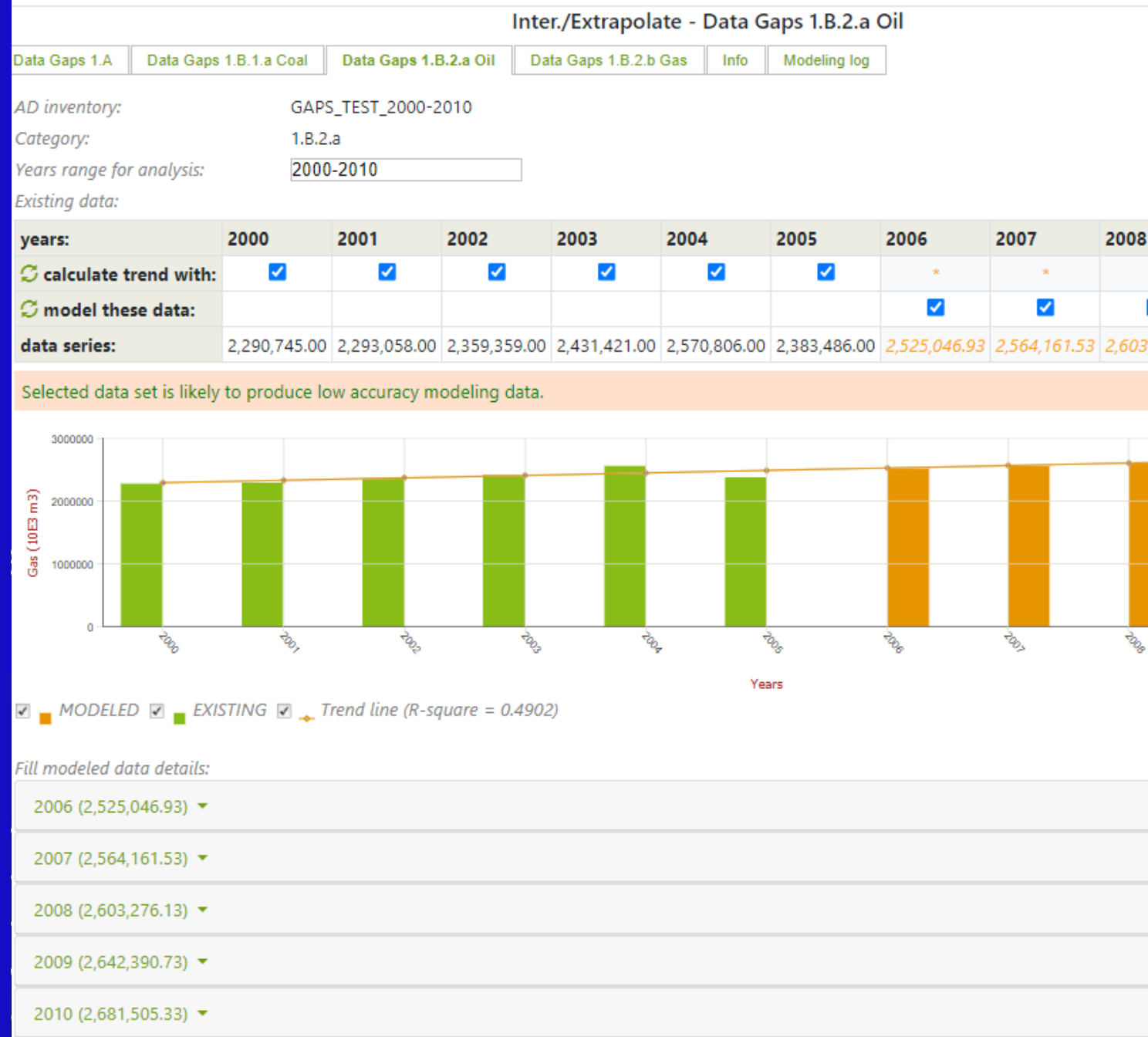
Analytic

Data Gaps



Functions

- Find gaps in the time series for selected categories and fuels
- Apply linear Interpolation/ Extrapolation method to fill the gaps
- Apply Surrogate method for gap filling
- Calculate the missing value(s) as an average of the selected data points
- Apply a user-defined (or selected) constant value for all selected years in the time series



About Data Gaps

When building time series for your inventory, it is **good practice** to use the same collection period and methods consistently over the time series data may be unavailable for a few years or the entire time series, which creates the issue of data gaps. SAGE will help you to fill these data gaps a whenever possible.

Overall, there are several approaches to gap-filling:

If you know that fuels are combusted in a category **X** for the entire time series, but can't distinguish this category from category **Y** for any of the years under both categories X and Y under a higher level category Z and make a note that fuels used in X and Y are reported under Z, and **explain transactions**

For example:

You are aware that your country has heat plants, electricity generation facilities, and a few plants that combine heat and power generation. However, the total amount of heat and power produced by all heat and power-producing plants is known, and it is impossible to disaggregate further for the entire time period, you can report the total amount under the category "1.A.1.a - Main Activity Electricity and Heat Production", and make a note that the reliable data for different types of electricity are included under 1.A.1.a.

If a few data points are missing

If for some category, you have the activity data for **some years of the time series, but other year's data are currently missing**, 2006 IPCC Guidelines data filling techniques (or their combination):

- When activity data could not be obtained for the base year or the most recent year in the inventory, it may be possible to **extrapolate** these numbers. The key assumption for this method is that the observed trend in the category data that are available during the period remains constant. SAGE will check it for you and advise if the extrapolation method is applicable.

- Data Gaps
- Dashboard
- Find
- Aggregate
- Inter./Extrapolate
- Surrogate
- Average value
- First value

Find - Data Gaps 1.A

Data Gaps 1.A

Data Gaps 1.B.1.a Coal

Data Gaps 1.B.2.a Oil

Data Gaps 1.B.2.b Gas

Info

Data categories: (selected - none) ▾

Select category

Fuels: (selected - 0) ▾

Select fuel

AD inventory:

Select ▾

Year(s):

2010-2020

Categories with gaps:

No data categories selected

Search

Clear



Click Search

Thank you!
Questions, please

