sage Sectoral Activity data for GHG Emissions

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

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Greenhouse Gas Management Institute

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

SOS!!!

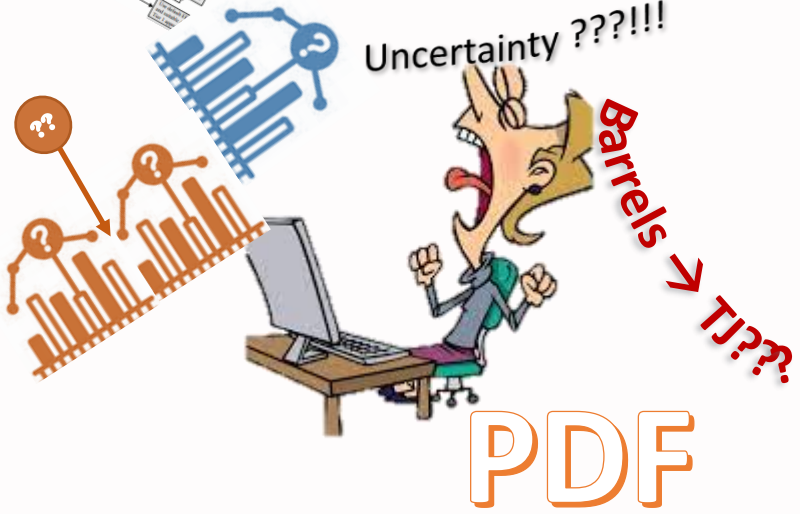
Voila!

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

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

- ✓ Units converted kt TJ $10^6 m^3$
- ✓ Data Analysis done, **Indicators built**

- ✓ Data are IPCC-ready



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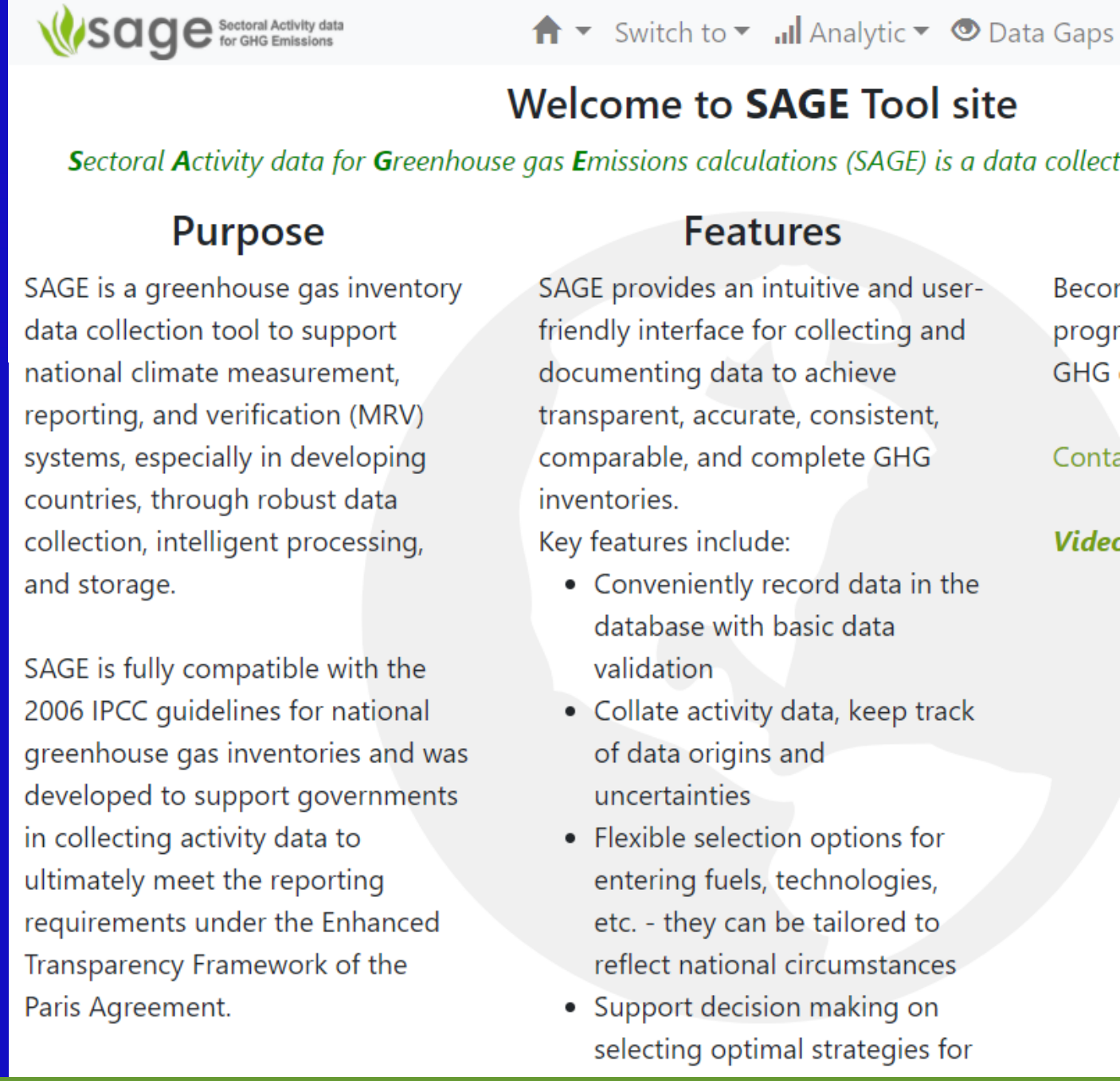
WELCOME TO

SAGE

Introduction

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



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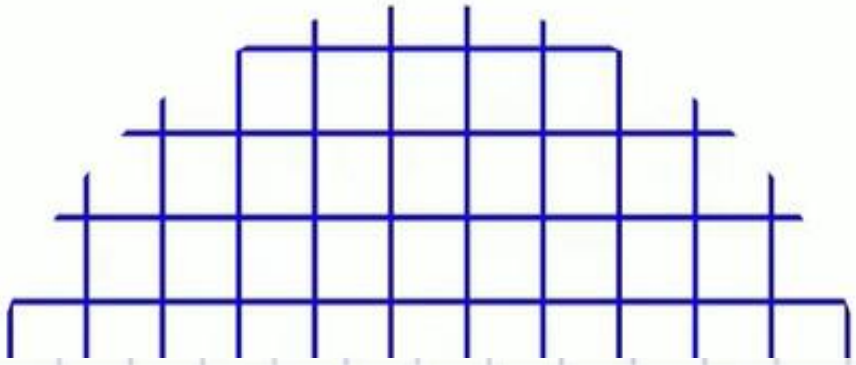
What does SAGE do?...



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

Recalculate units

Set uncertainty following 2006 IPCC logic

Apply top-down approach

Find & Fill **Data gaps**

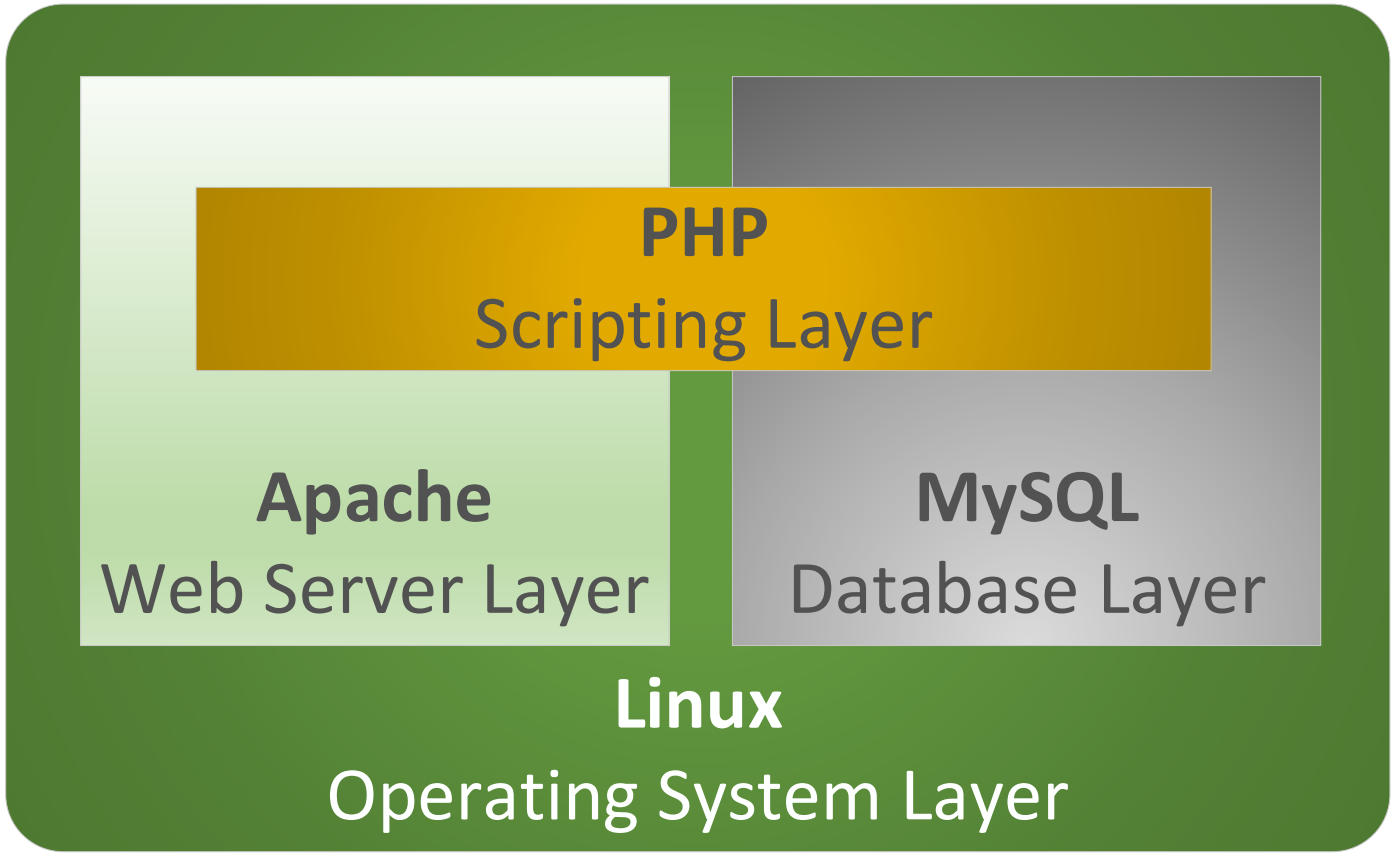
Adjust menus to **national circumstances**

Perform **Data analysis**

Calculate **Indicators**

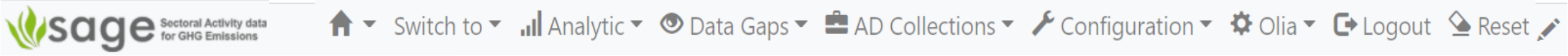
Support data **Review & approval process**

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)

Navigation links for the currently selected functional component

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

- Administration
- Configuration
- AD Collections
- Analytic
- Data Gaps

Functional components in SAGE

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

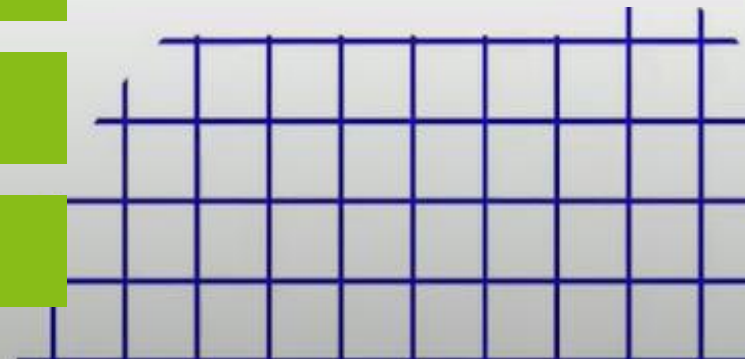
<< < > >> *show* 30 *records, starting from #* 1 *(total 10)* Search Clear

Time-series AD collection ↓	years range	state	Annual AD	records	categories
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

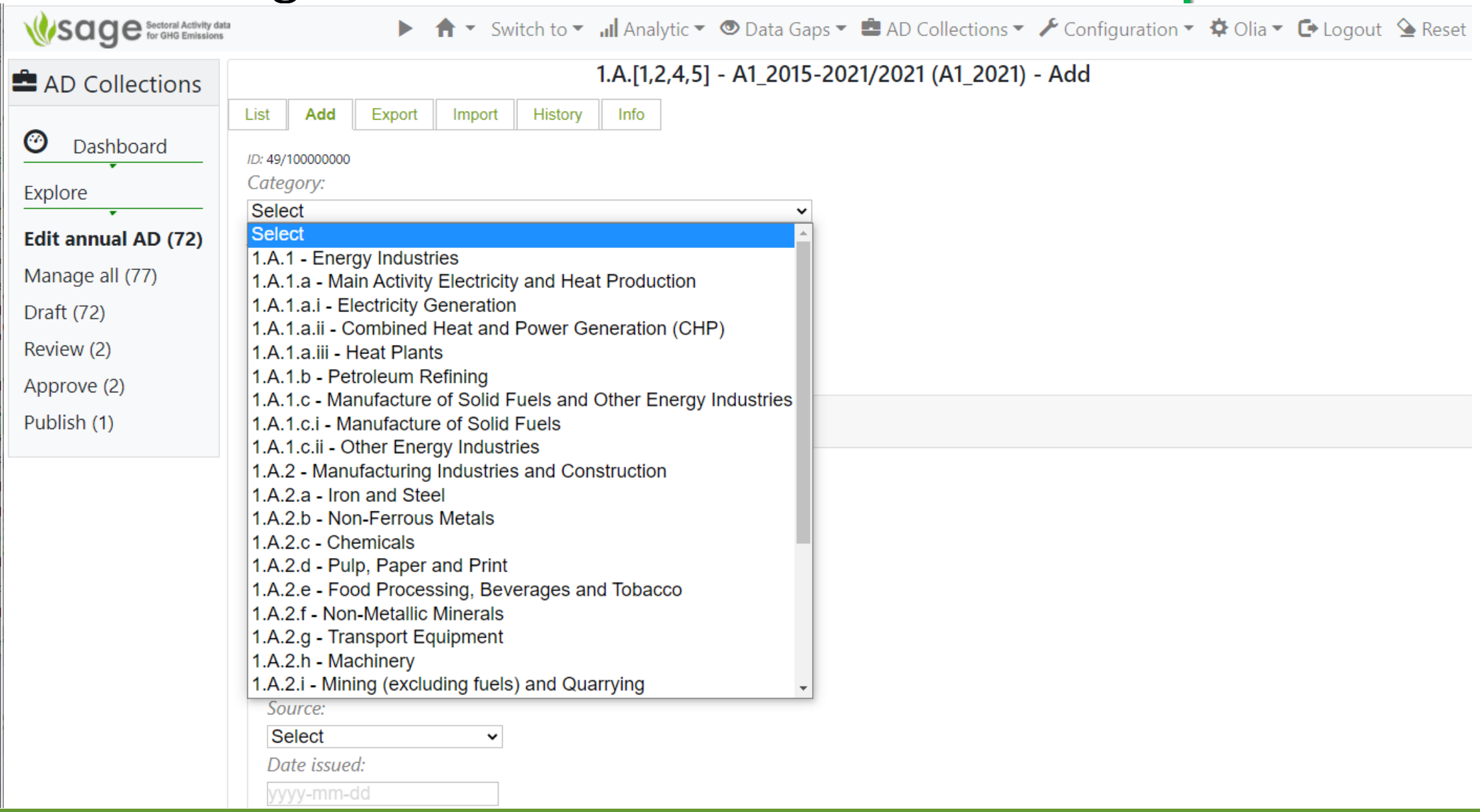
How to?

Adjust to the national circumstances

- Administration
- **Configuration**
- AD Collections
- Analytic
- Data Gaps



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



Categories - List

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

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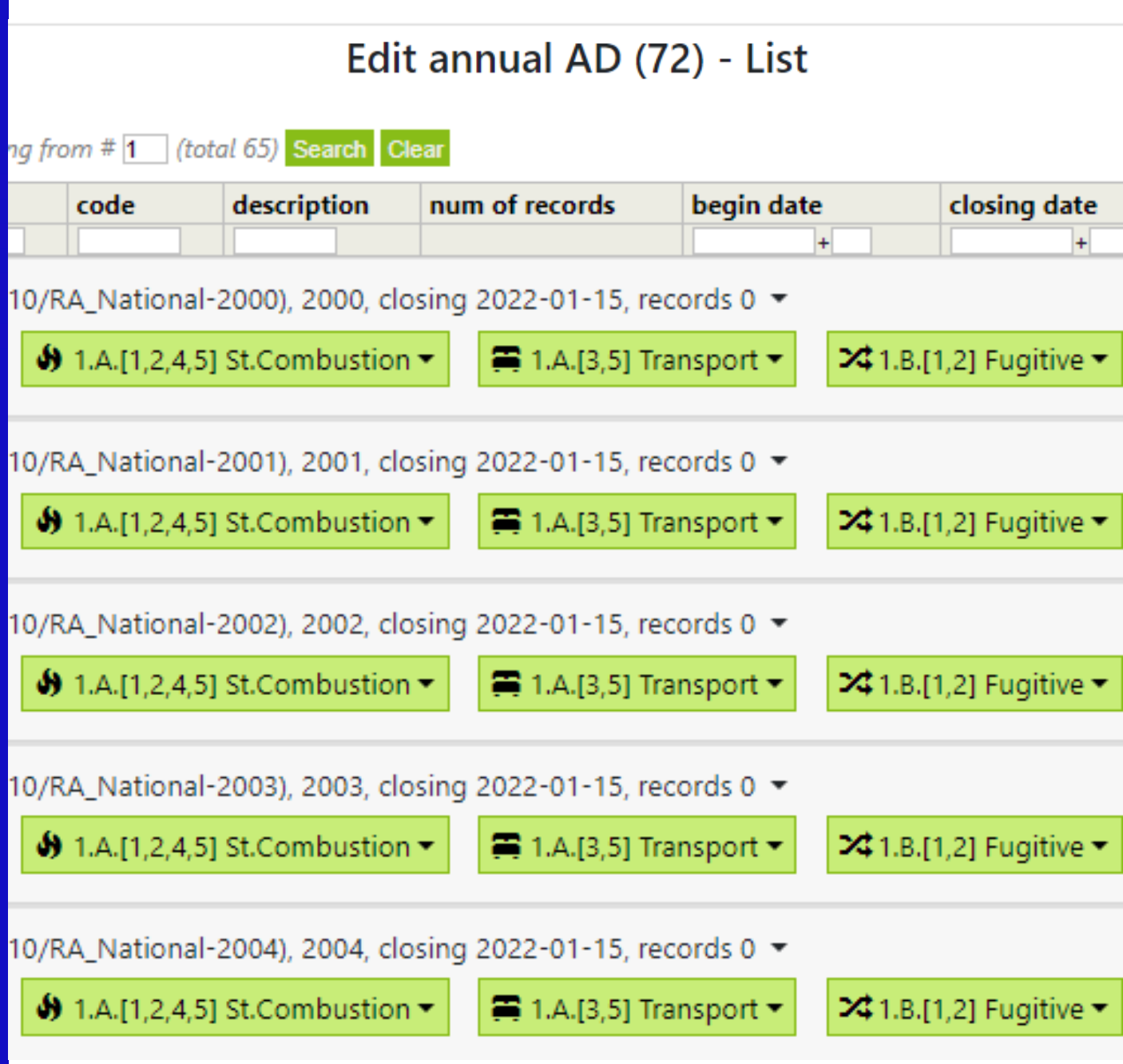
How to?

Create & Manage
AD Collections

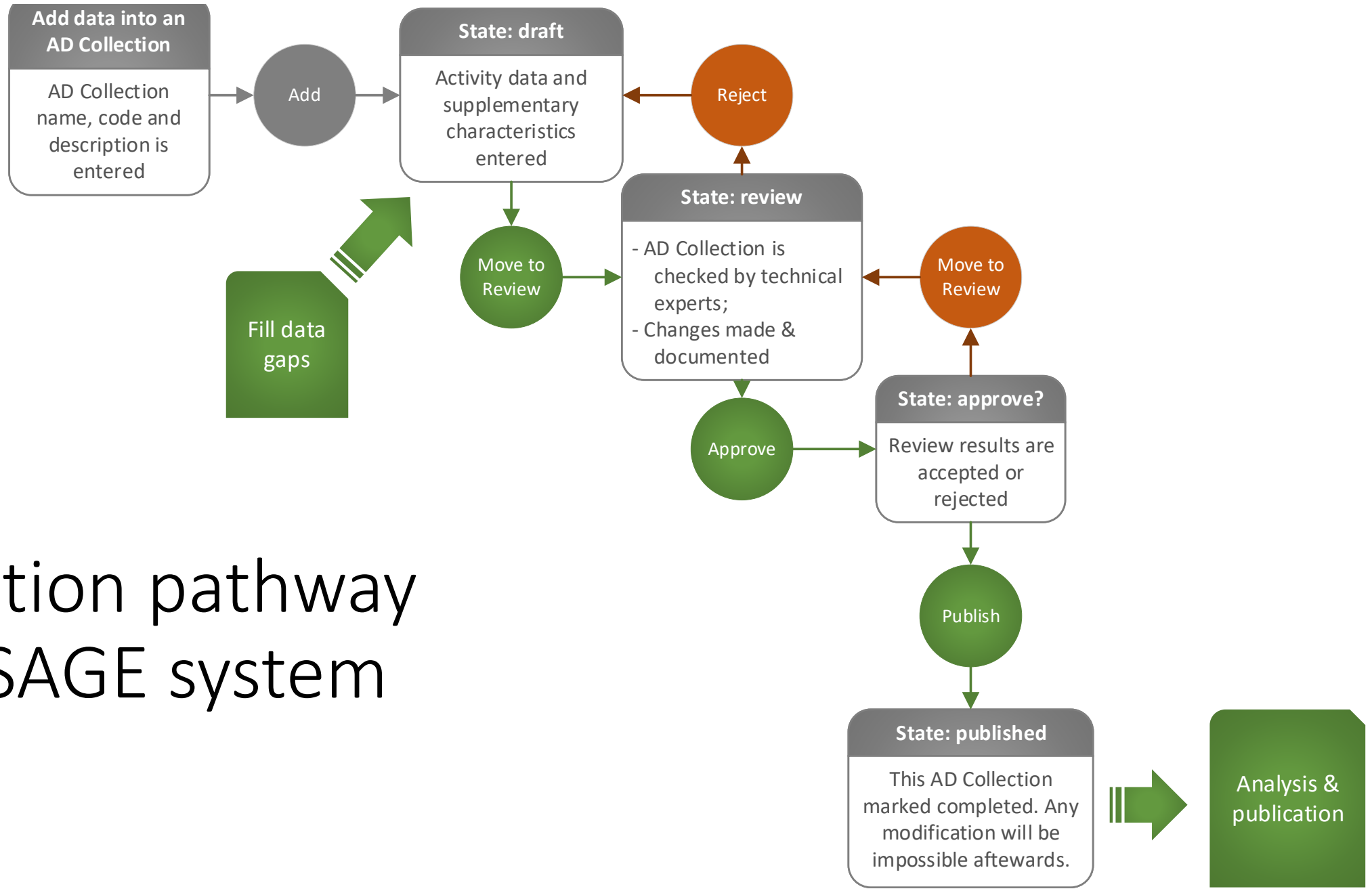
- Administration
- Configuration
- **AD Collections**
- Analytic
- Data Gaps

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)



AD collection pathway through SAGE system



AD entry

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

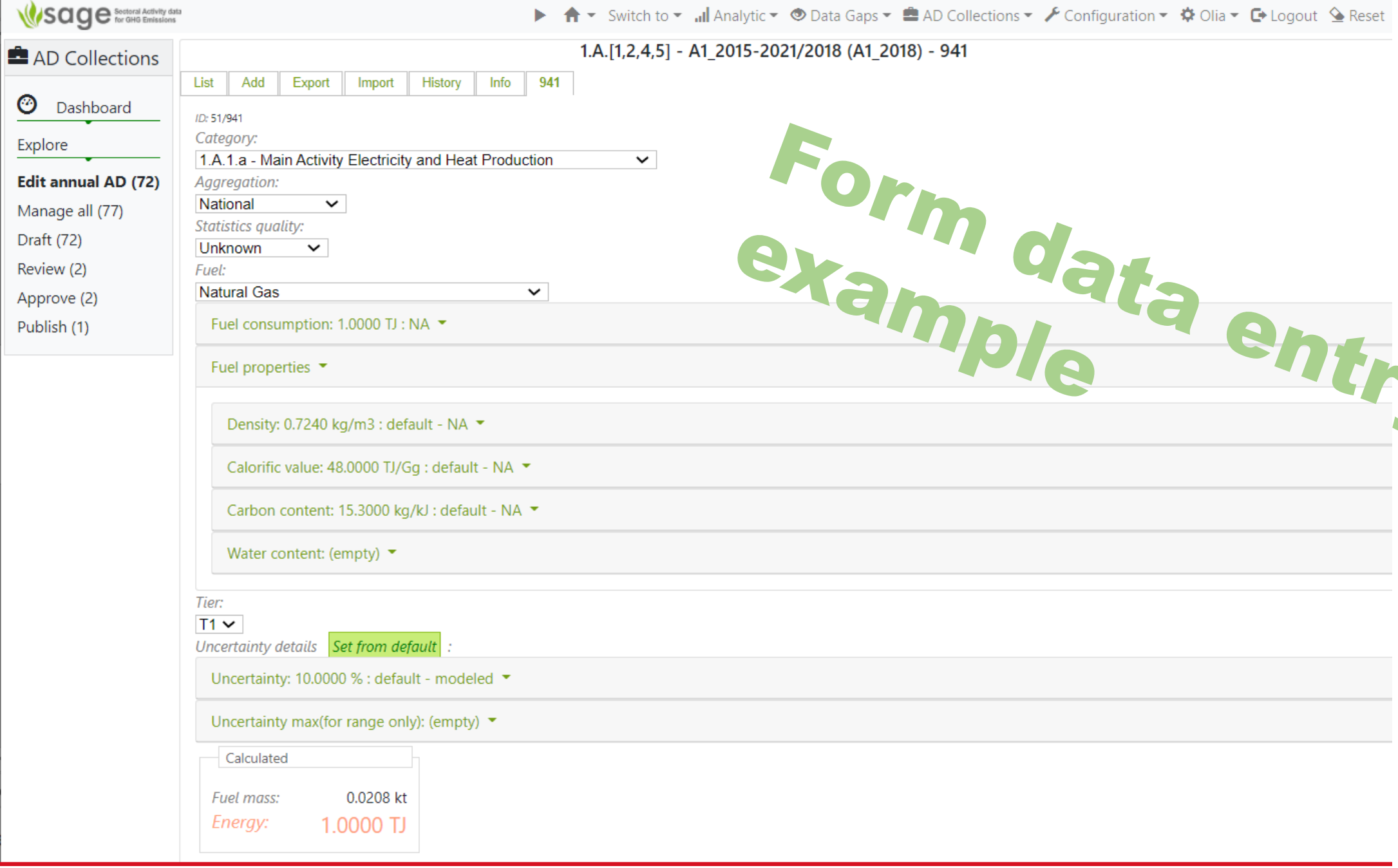
Create the AD collection → Go to relevant category group → Use ADD option → Fill in the form → Add

Using Excel template, recommended for a time-series:

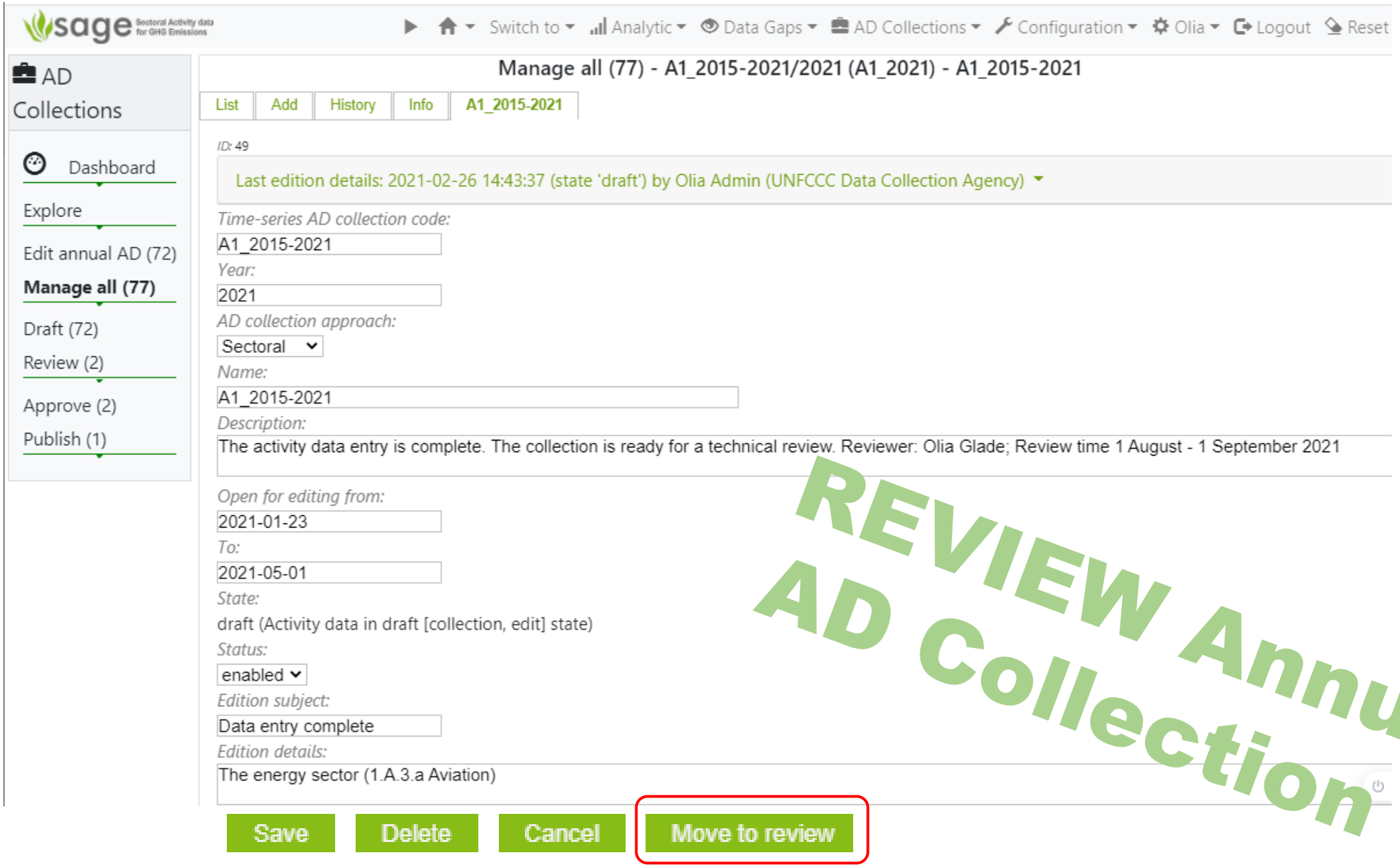
Create the AD collection → Go to relevant category group → Download the template → Fill in the template for the time series → Upload the file to SAGE

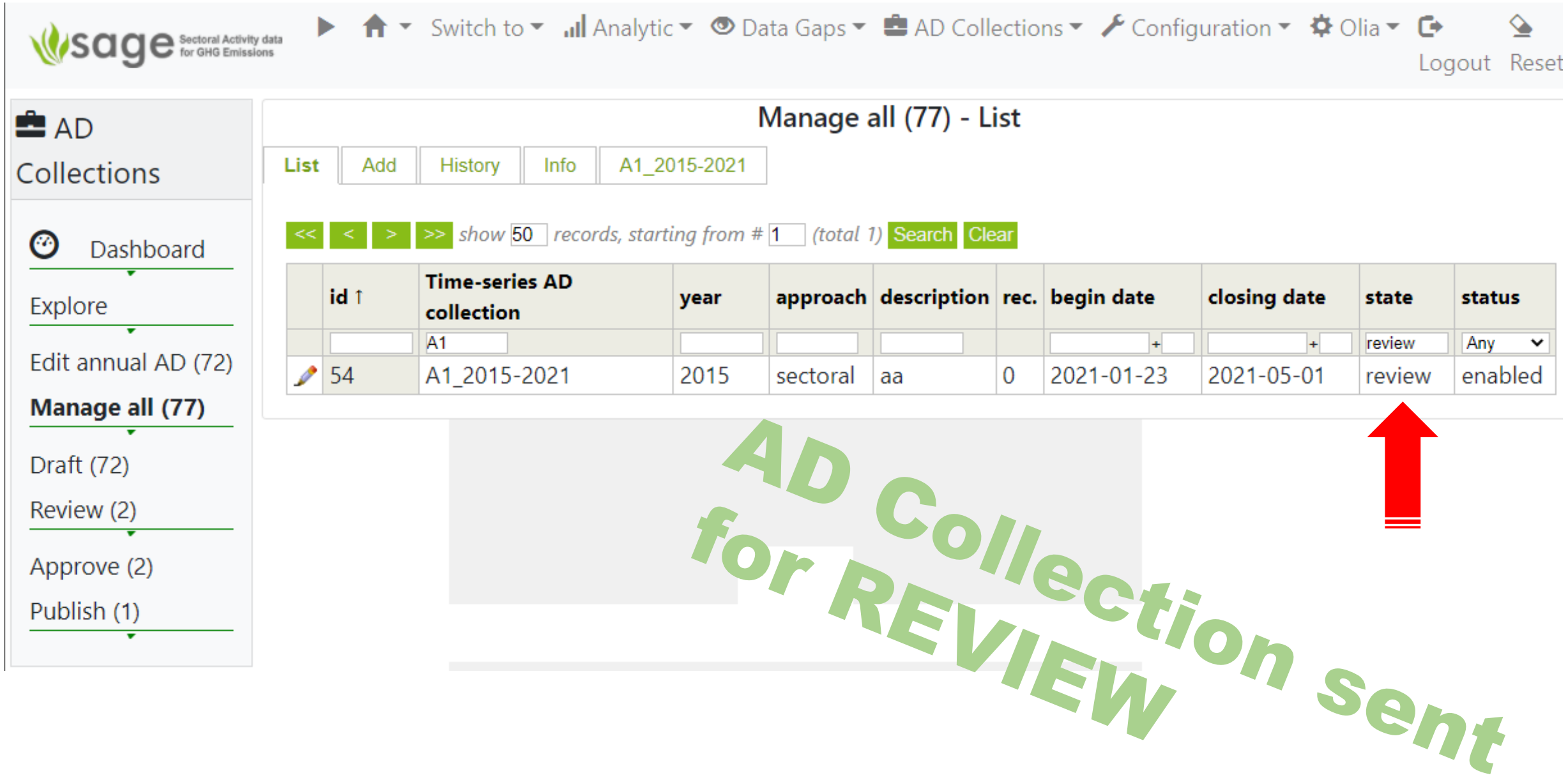
Using the previous time-series AD Collection, recommended for editing time-series:

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


sage
Switch to
Analytic
Data Gaps
AD Collections
Configuration
Olia
Logout
Reset
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

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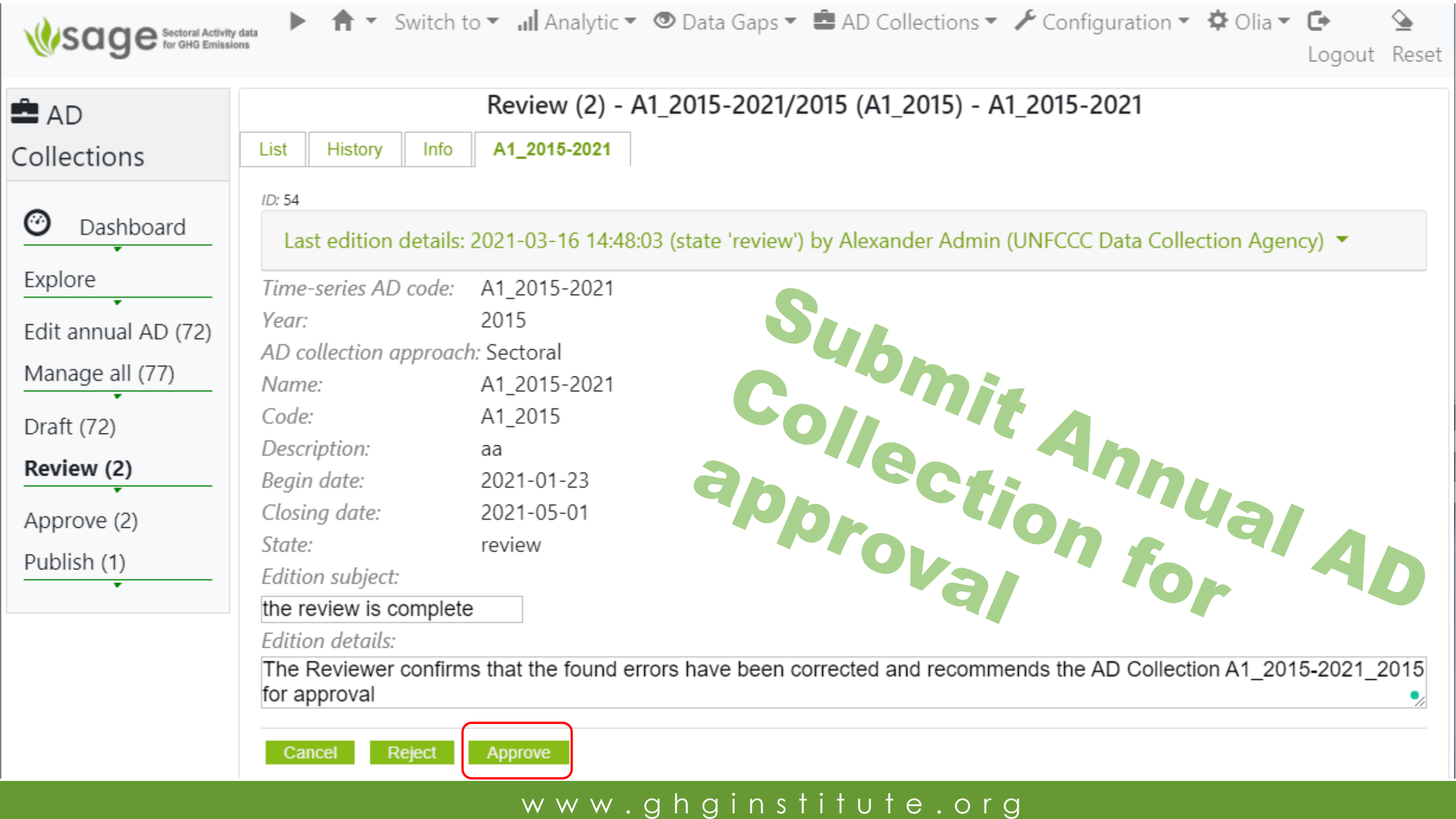
Publish (1)
Manage all (77) - List
List
Add
History
Info
A1_2015-2021
<< < > >> show 50 records, starting from # 1 (total 1) Search Clear
id ↑
Time-series AD collection
year
approach
description
rec.
begin date
closing date
state
status
A1
review
Any
54
A1_2015-2021
2015
sectoral
aa
0
2021-01-23
2021-05-01
review
enabled
AD Collection sent for REVIEW


sage
Sectoral Activity data for GHG Emissions
Switch to
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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

Manage all (77) - List

List | Add | History | Info | A1_2015-2021

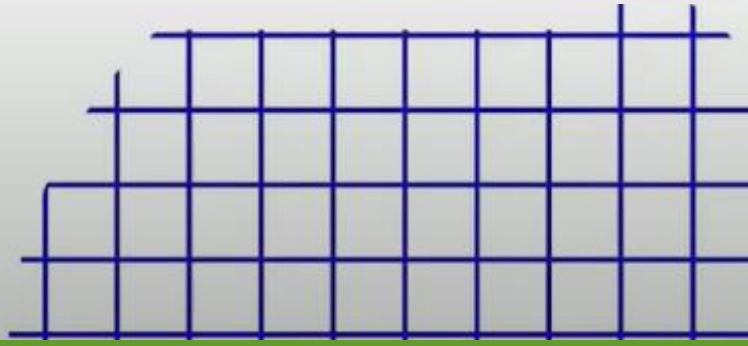
<< < > >> show 50 records, starting from # 1 (total 1) Search Clear

	id ↑	Time-series AD collection	year	approach	description	rec.	begin date	closing date	state	status
	13						+	+	approve	Any
✎	13	A2	2021	sectoral	1.A.1 category only	5	2020-12-22	2021-01-08	approve	enabled

How to?

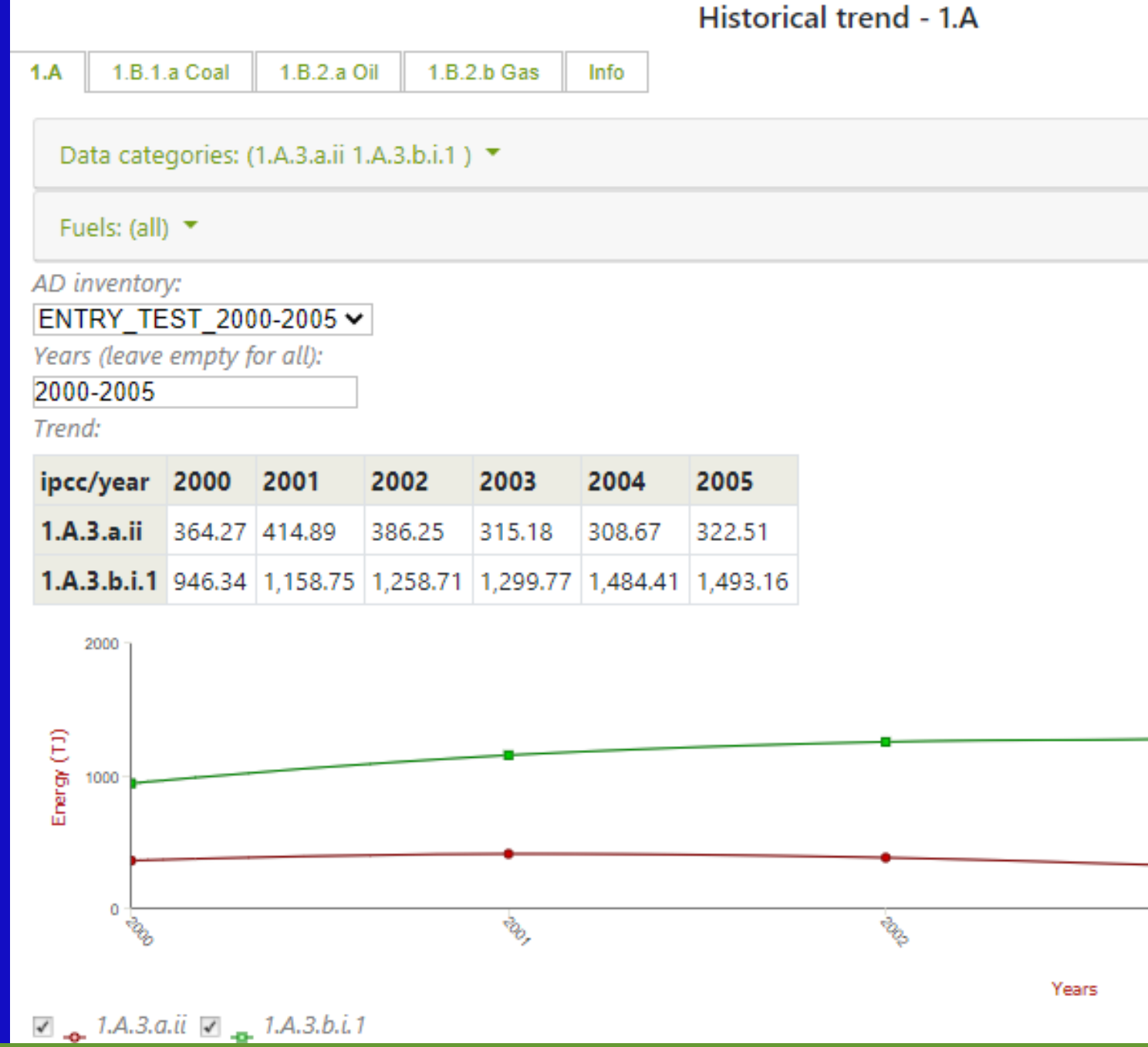
Analyse data

- Administration
- Configuration
- AD Collections
- **Analytic**
- Data Gaps



Functions

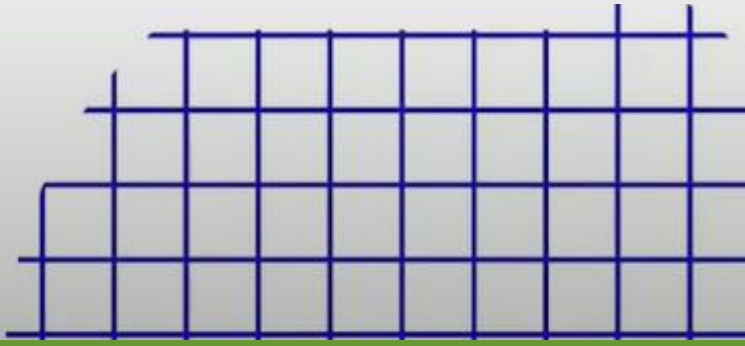
- Calculate total AD values for all selected categories and fuels
- Build historical trend for selected categories and fuels
- Rank AD by category (for fuel consumption, in TJ)
- Rank by fuel combusted (for fuel consumption, in TJ)
- AD change between any two years
- Intensity Indicator calculations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



How to?

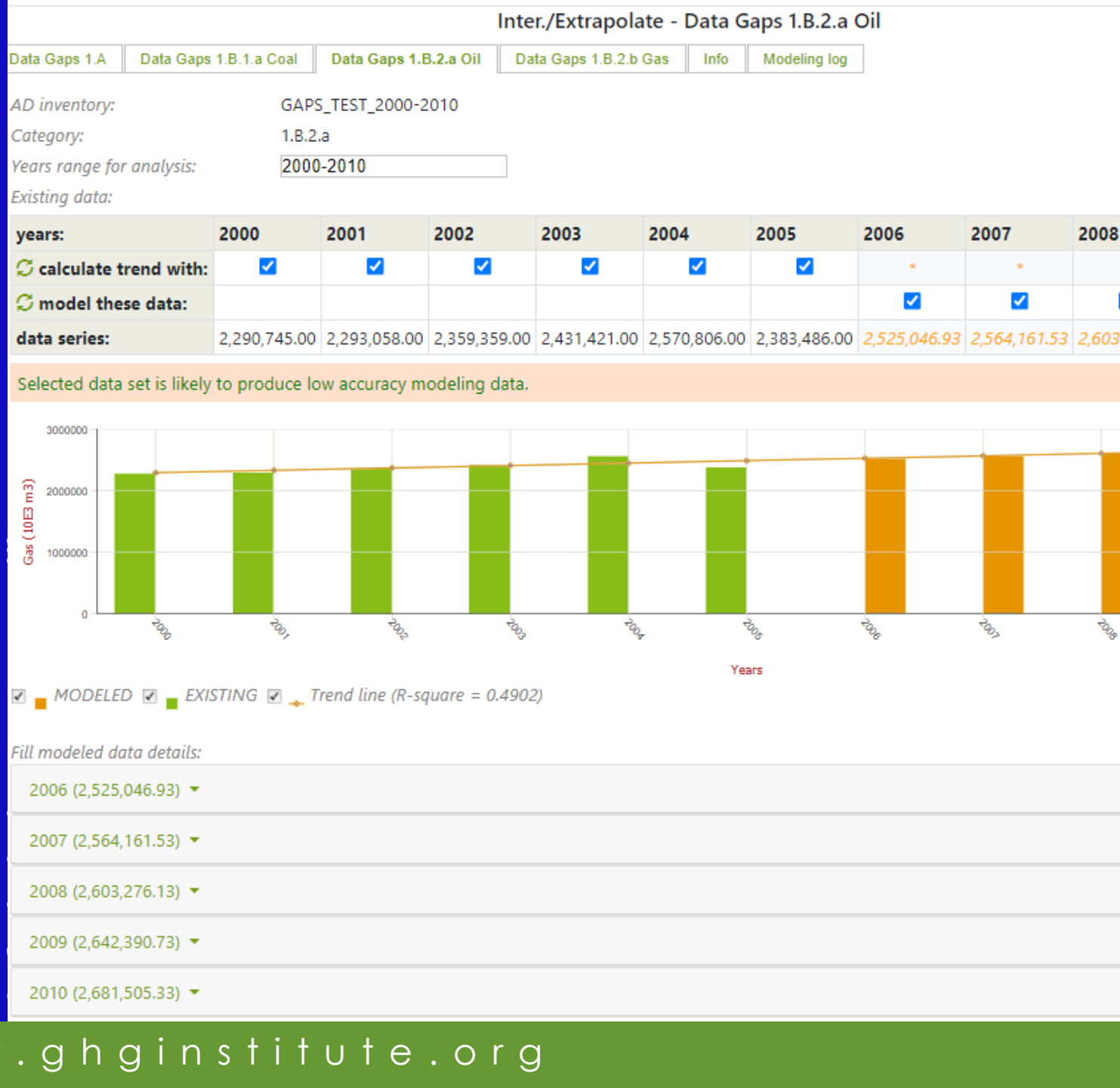
Find and Fill Data Gaps

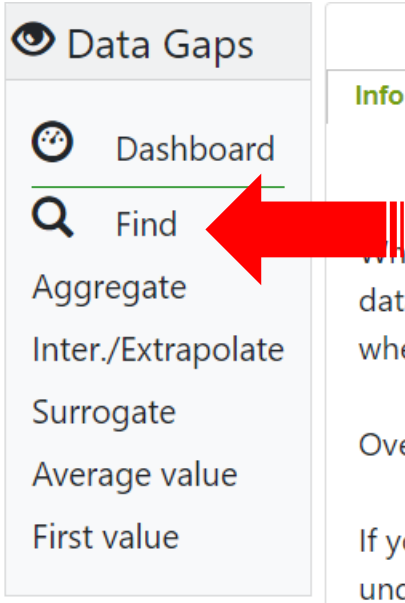
- Administration
- Configuration
- AD Collections
- Analytic
- **Data Gaps**



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





Dashboard - Dashboard

Info | Modeling log

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 y 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 trar**

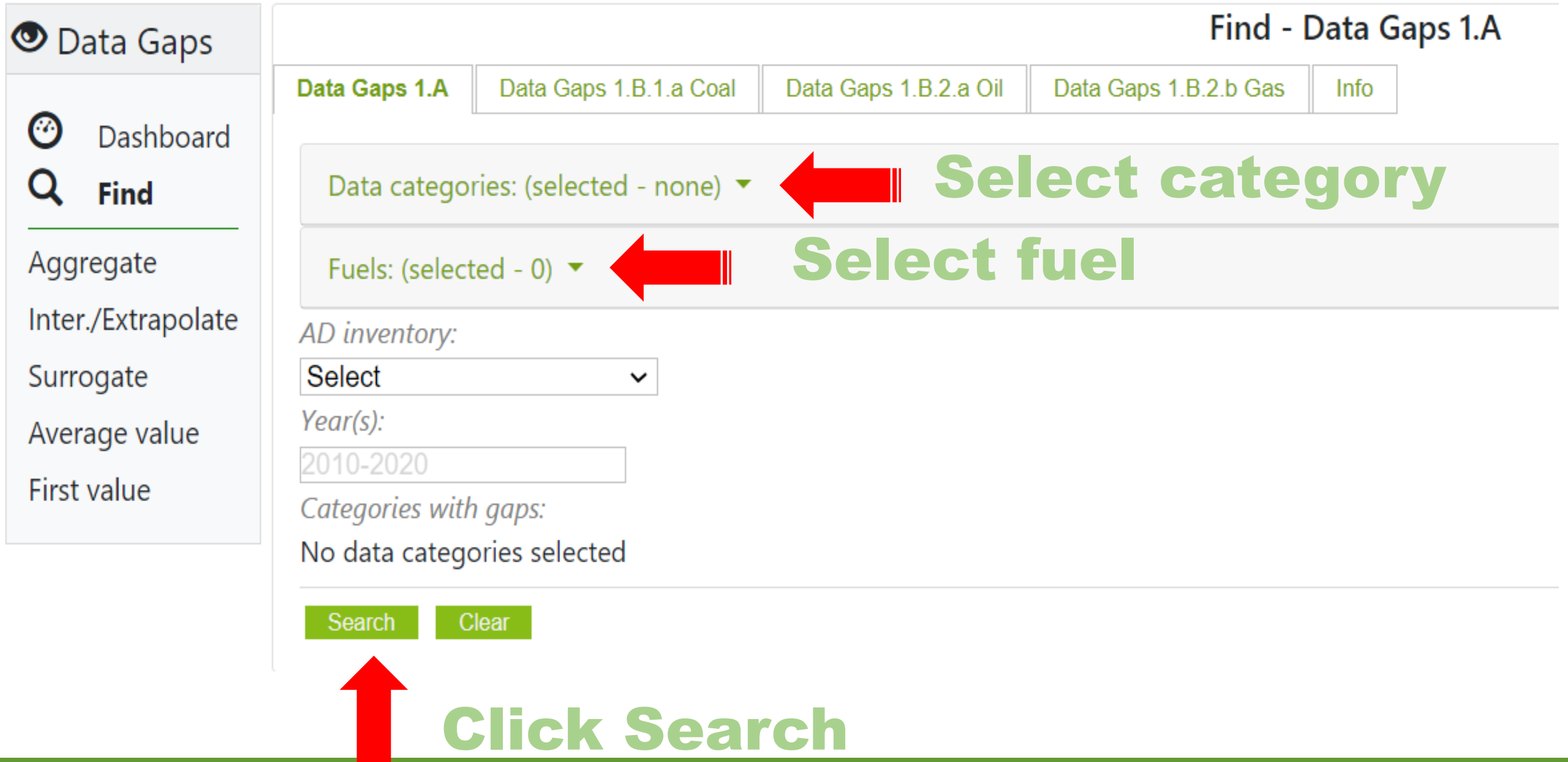
For example:

You are aware that your country has heat plants, electricity generation facilities, and a few plants that combine heat and power generation. Howeve 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 amo 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 ar and therefore, they 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 Guid 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 n estimates. The key assumption for this method is that the observed trend in the category data that are available during the period remains consta 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

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Thank you!
Questions, please