

E-VO

Energy Validation Outlet

evo.iea.org

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INTRODUCTION

The Energy Validation Outlet (E-VO) is an evolution of the Energy Data Management Center. It has the same purpose of continuously improving energy data to provide the policy and analytical communities with a strong foundation and the capacity to understand and monitor the markets they are trying to influence.

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The objective of E-VO is to enhance user experience and increase system and query performance, while assuring improvement in timeliness, completeness and consistency. It also aims to enhance data quality and consistency with better usage of historical data and existing validation checks.

The concepts are still the same, with data collection, data quality and reporting divided by modules and questionnaires. A submission is part of a questionnaire (Coal, Gas, Oil, Electricity or Renewables) that is part of a module (Annual, Monthly, JODI, QuE and MINI).

A data submission can be produced using ASCII-CSV files, the only pre-requisite to the data transfer is to use the same “data dictionary” (naming convention of the different dimensions - products, flows, time...) as the one embedded in the Monthly/JODI questionnaires.

E-VO has been designed and optimized for Google Chrome. Other browsers such as Internet Explorer and Mozilla Firefox can be used alternatively.

FIRST-TIME LOGIN

Go to <https://evo.iea.org/login> and select the “Forgot your password” option. Review the terms and tick the box if you agree to them.

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Figure 1: Login

Enter your email account.

Figure 2: Request password

You will receive an email with the procedure to create a new password.

Figure 3: Email sample

HOME

E-VO allows data input for the five different modules (Annual, Jodi, Mini, MOS and QuE) for each fuel (Coal, Electricity, Gas, Oil and Renewables). Each user account has a specific set of credentials that will allow the users to have READ/WRITE access to the appropriate modules.

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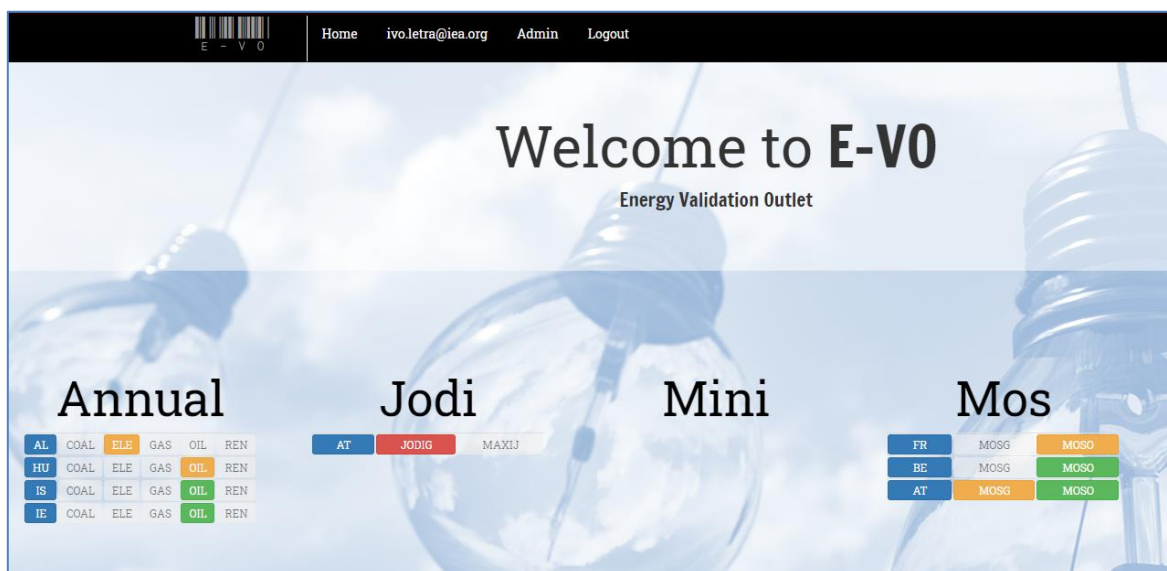


Figure 4: Homepage

Depending on the modules the user can access, a summarized view of the data changes will be displayed.

There are two types of changes:

- Last change – When new data submitted to the system
- Last notification – When the IEA was notified

For these two types of changes, the questionnaires that were changed, when these changes occurred and the country they refer to are displayed.

REPORTS

Each user account has a specific set of credentials that allows the users to have READ/WRITE access to the appropriate modules.

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In addition to the questionnaires, an extra report, the “Data 360°”, is available which details all data changes and validates the data consistency.

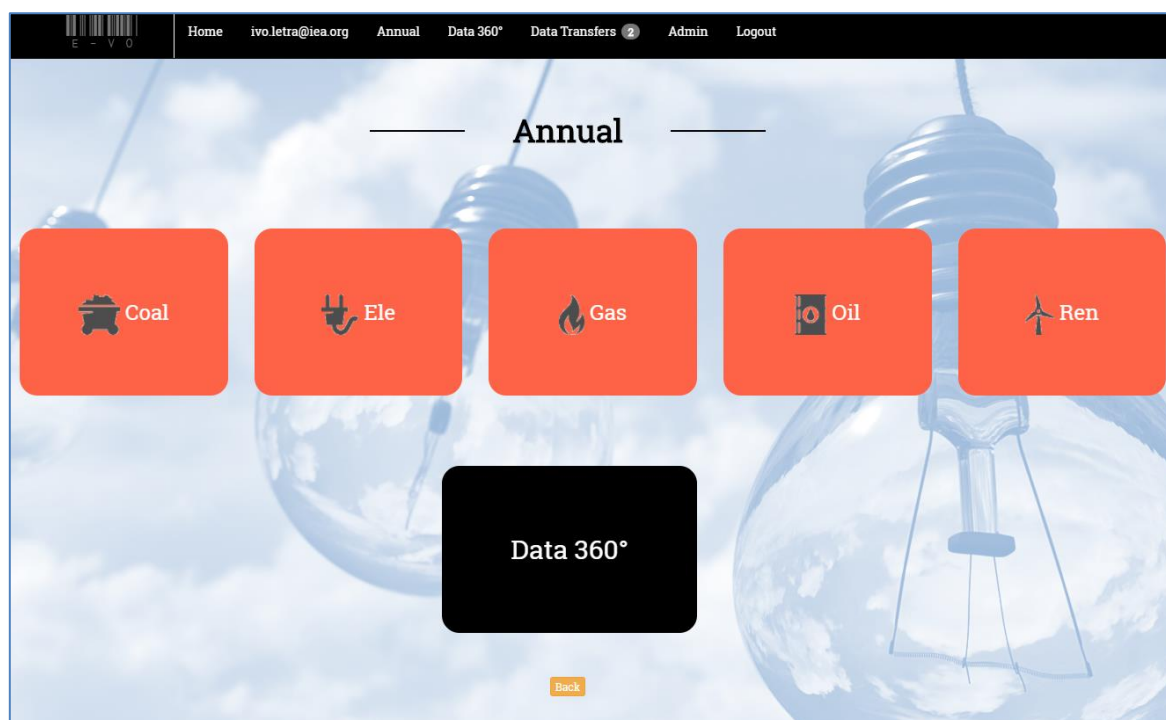


Figure 5: Reports

Questionnaires

The questionnaires for each module in E-VO are the same as the Joint Annual Questionnaires (JAQ), MINI, MOS, QuE and JODI that are available in Excel:

- Annual - COAL - 43 reports
- Annual - ELE - 72 reports
- Annual - GAS - 17 reports
- Annual - OIL - 111 reports
- Annual - REN - 43 reports
- JODI - JODIG - 6 reports
- JODI - MAXIJ - 5 reports
- MINI - COAL - 3 reports
- MINI - ELE - 4 reports
- MINI - GAS - 5 reports
- MINI - REN - 1 reports
- MOS - MOSG - 6 reports
- MOS - MOSO - 23 reports
- QuE - QUE - 5 reports

These are divided into two types of reports: Forms and Time series.

Report Code	Report Name	
Remarks	Annual - Natural Gas	Show
Form 1	Supply of natural gas	Show
Form 2a	Inland consumption by sector	Show
Form 2b	Total final consumption by sector	Show
Form 3	Imports by origin	Show
Form 4	Exports by destination	Show
Form 5	Gas storage capacity	Show
Time series 1	1. Supply	Show
Time series 2	2i. Consumption	Show
Time series 3	2ii. TFC Energy Use	Show
Time series 4	2iii. TFC Non-Energy Use	Show
Time series 5	3i. Imports	Show
Time series 6	3ii. Imports Of Which LNG	Show
Time series 7	4i. Exports	Show
Time series 8	4ii. Exports Of Which LNG	Show

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Figure 6: Types of reports

Both types of reports display data indicating if the figure is correct based on the existing consistency checks. All issues are presented in **red**, as can be seen in Figures 8 and 9.

Legend	
Submitted	New
Errors	No data

Figure 7: Colour legend for reports

Forms

Form reports show data by Country, Cycle and Period.

	Natural Gas Cubic Meters	Natural gas (renewables)	Natural gas (non-renewables)
Indigenous production	1,837	69,647	37,913
Associated gas	0	0	32,000
Non-Associated Gas	1,837	69,647	37,913
Colliery gas	0.0	0.0	0.0
From other sources	0.0	0.0	0.0
From other sources - oil	0.0	0.0	0.0
From other sources - coal	0.0	0.0	0.0
From other sources - renewables	0.0	0.0	0.0
Total imports (balance)	10,053	379,696	37,911
Total exports (balance)	2,772	106,297	37,918
International marine bunkers	0.0	0.0	0.0
Stock changes (national territory)	320	12,122	37,881
Inland consumption (calculated)	8,162	331,834	37,911
Statistical differences	0	0	0
Inland consumption (observed)	8,162	331,834	37,911
Opening stock level (national territory)	2,698	103,328	38,298
Closing stock level (national territory)	3,018	115,458	38,254
Opening stock level (held abroad)	0.0	0.0	0.0
Closing stock level (held abroad)	0.0	0.0	0.0
Cushion gas closing stock level	0.0	0.0	0.0
Gas vented	0.0	0.0	0.0
Gas flared	0.0	0.0	0.0

Automatic Checks

Biogases (Natural gas blending plants): OK

OCV check (AGASPRD): OCV should equal T1 divided by CM times one thousand.

Figure 8: Forms layout

Time Series

Time series reports show data by Country, Cycle, and Product within a time range of 5 periods.

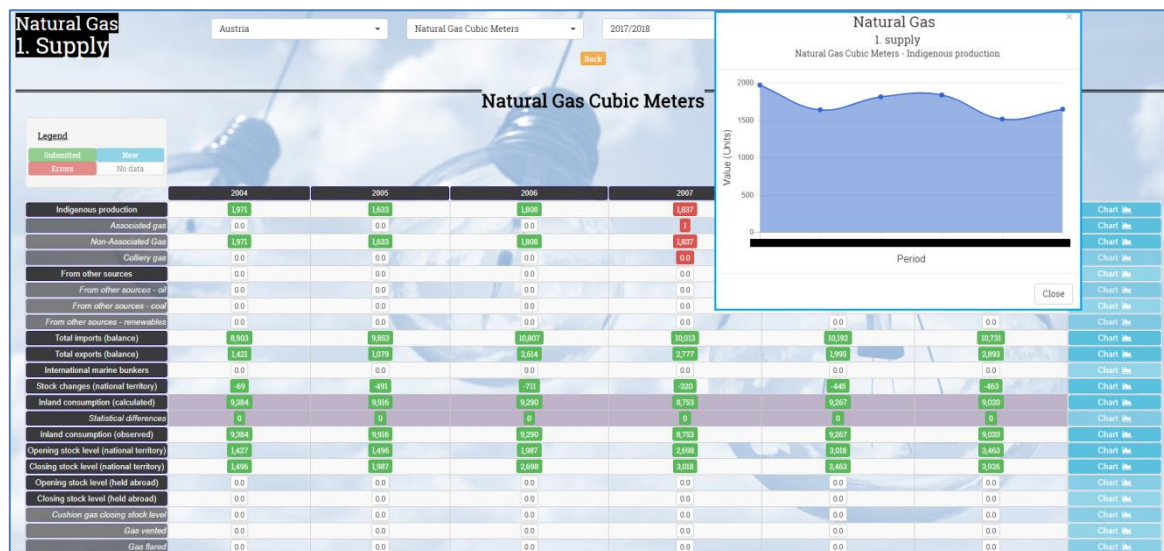


Figure 9: Time series layout

Data entry

If a user has WRITE privileges, data points can be edited by clicking on the data the user wishes to change in either type of report. Calculated values such as statistical differences and inland consumption (calculated) cannot be changed in this manner as they are calculated from other data inputs.

The screenshot shows the 'Natural gas (terajoules) - Associated gas' data entry window. It includes a 'Current Data' section with a table for 'User', 'Import File', 'Submission', 'Modif. Mode', 'Valid From', 'Exported by IEA in', and 'Value'. The 'Expired Data' section shows a table with 'User', 'Date Uploaded', 'Exported by IEA in', 'Modif. Mode', and 'Value'. The 'Close' button is at the bottom right.

User	Import File	Submission	Modif. Mode	Valid From	Exported by IEA in	Value
	Manual change	2017/2018	Data entry	Mon, 13 Nov 2017 17:35:20	-	2

User	Date Uploaded	Exported by IEA in	Modif. Mode	Value
	Mon, 13 Nov 2017 17:34:06	-	Data entry	123
	Thu, 26 Oct 2017 17:29:44	-	Data entry	2

Figure 10: Data point log

If a figure is being edited, a pop-up window showing the historic information about this specific data point will appear, including:

- The user that submitted the data
- Name of the file used to submit the data
- The cycle (if applicable) it refers to

- Modification Mode used to change the data point: Official published data (IEA submitted this data point), computed (it's the result of a calculation) or data entry (changed directly by the user)
- When was the data point created
- When the IEA downloaded the figure
- What the previous figure was

The user can change the figure and provide a comment if needed.

Figure 11: Change data point

Alerts

All questionnaires are subjected to validation checks, of which there are over a thousand in E-VO for all the questionnaires. These checks are executed in run time, meaning as soon as there is a data point change in a given report, all checks associated with this report will be run.

If errors exist, all data points linked to the error will be highlighted in **red**.

For instance, Figure 8 shows the error “GCV check (AGASPRD)”.

If the user clicks on the error, a pop-up window will appear with more detailed data. The figures that appear in the **dark blue** section are compared to the figures in **light blue** section, and the numbers highlighted in red are the corresponding errors.

GCV check (AGASPRD)
 [REDACTED] - Supply of natural gas

GCV should equal TJ divided by CM times one thousand.

Product	Natural gas gross calorific value (kJ/m3)
Item	Associated gas
Value	32,000
Product 2	Natural Gas Cubic Meters
Item 2	Associated gas
Value 2	1
Product 2	Natural gas (terajoules)
Item 2	Associated gas
Value 2	0

Close

Figure 12: Error table

In this particular case, the following formula doesn't match with the existing data:

$$GCV = 1000 \times \frac{TJ}{CM}$$

Data 360°

A user can use the Data 360° to assess the quality of a data submission, or to notify the IEA of a new data submission.

The analysis performed by Data 360° is detailed by:

- Questionnaire
- Country
- Cycle
- Period

Data 360°

Last submissions, notifications, warnings and errors

Electricity and Heat, Natural Gas, Renewables, Oil, Coal | [REDACTED] | 2017/2018 | 2015, 2014 | [New data](#) [All data](#)

New or modified data when compared with the previous submission.

Questionnaire	Country	Period	Submission	Last Modification	Notified?	Nbr. Data Points	Nbr. Warnings	Nbr. Errors
Renewables	[REDACTED]	2015	2017/2018	Mon, 13 Nov 2017 16:19:55	No	218	0	19
Renewables	[REDACTED]	2014	2017/2018	Mon, 13 Nov 2017 16:19:55	No	220	0	19
Oil	[REDACTED]	2015	2017/2018	Tue, 24 Oct 2017 15:26:37	Yes, 28 Oct 2017 09:53:28	960	0	7
Oil	[REDACTED]	2014	2017/2018	Tue, 24 Oct 2017 09:08:15	No	997	0	4
Natural Gas	[REDACTED]	2015	2017/2018	Wed, 08 Nov 2017 10:35:05	No	106	0	9
Natural Gas	[REDACTED]	2014	2017/2018	Wed, 08 Nov 2017 10:35:05	No	106	0	6
Coal	[REDACTED]	2015	2017/2018	Mon, 13 Nov 2017 16:23:18	No	244	0	12
Coal	[REDACTED]	2014	2017/2018	Mon, 13 Nov 2017 16:23:18	Yes, 13 Nov 2017 16:23:18	245	0	12

Figure 13: Data 360°

Number of modifications

Data 360° tracks two types of modifications:

All data

New data

- *All data*: All existing data points for a given Questionnaire, Country, Cycle and Period
- *New data*: Data points modified when compared with the previous data submitted and downloaded by IEA

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The difference between *All data* and *New data* can be explained in the following way:

- If Country X submits data points for 2015 for the first time, i.e. 244 new data points, both options *All data* and *New data* will show the same number of data points, 244.

Questionnaire	Period	Submission	Last Modification	Notified?	Nbr. Data Points	Nbr. Warnings	Nbr. Errors
Coal	2015	2017/2018	Mon, 13 Nov 2017 15:23:18	No	244	0	12

Figure 14: All data

- The IEA downloads the 2015 data, 244 data points. The *All data* option will still show 244 data points, but there is now no data for the *New data* section.
- Later, the user realizes that there are 3 data points that need to be changed. In this case, the *All data* section still shows 244 (the data points existed before they were updated to new figures), while the *New data* section reports 3 data points.

Questionnaire	Period	Submission	Last Modification	Notified?	Nbr. Data Points	Nbr. Warnings	Nbr. Errors
Coal	2015	2017/2018	Tue, 14 Nov 2017 12:25:51	No	3	0	12

Figure 15: New data

By clicking the Nbr. Modifications button, all the changes that occurred for that period can be seen.

Product	Item One	Item Two	Submission	Date Prev. Value	Prev. Comment	Prev. Value	Prev. Value Download Date	Date Value	Comment	Value	Abs. Change	% Change
Anthracite	Indigenous production	---	2017/2018	2017-11-13 15:23:18	---	0	2017-11-13 15:23:18	2017-11-13 15:23:18	---	5	5	100.0
Anthracite	Surface production	---	2017/2018	2017-11-13 15:23:18	---	2	---	2017-11-14 12:25:51	---	3	1	50.0
Anthracite	Underground production	---	2017/2018	2017-11-13 15:23:18	---	6	---	2017-11-14 12:25:51	---	5	-1	-16.7

Figure 16: Data modifications report

Errors

The errors are calculated based on the existing validation checks. In the previous example, COAL 2015 has 12 errors. Those are explained in the following report:

Automatic Checks		
Supply and inland consumption by sector	Autoproducers CHP plants (Blast furnace gas)	Should correspond to those quantities reported in Table 6B of the Annual electricity questionnaire
Supply and inland consumption by sector	Autoproducers CHP plants (Coke oven gas)	Should correspond to those quantities reported in Table 6B of the Annual electricity questionnaire
Supply and inland consumption by sector	Autoproducers CHP plants (Lignite)	Should correspond to those quantities reported in Table 6B of the Annual electricity questionnaire
Supply and inland consumption by sector	Autoproducers CHP plants (Other bituminous coal)	Should correspond to those quantities reported in Table 6B of the Annual electricity questionnaire
Supply and inland consumption by sector	Autoproducers CHP plants (Other recovered gases)	Should correspond to those quantities reported in Table 6B of the Annual electricity questionnaire
Supply and inland consumption by sector	Autoproducers heat plants (Blast furnace gas)	Should correspond to those quantities reported in Table 6B of the Annual electricity questionnaire
Supply and inland consumption by sector	Autoproducers heat plants (Other recovered gases)	Should correspond to those quantities reported in Table 6B of the Annual electricity questionnaire
Supply and inland consumption by sector	Main activity producer CHP plants (Anthracite)	Should correspond to those quantities reported in Table 6A of the Annual electricity questionnaire
Supply and inland consumption by sector	Main activity producer CHP plants (BKB)	Should correspond to those quantities reported in Table 6A of the Annual electricity questionnaire
Supply and inland consumption by sector	Main activity producer CHP plants (Lignite)	Should correspond to those quantities reported in Table 6A of the Annual electricity questionnaire
Supply and inland consumption by sector	Main activity producer CHP plants (Other bituminous coal)	Should correspond to those quantities reported in Table 6A of the Annual electricity questionnaire
Supply and inland consumption by sector	Main activity producer heat plants (Lignite)	Should correspond to those quantities reported in Table 6A of the Annual electricity questionnaire

Figure 17: Error list

More details are available by clicking on a specific error.

Autoproducers CHP plants (Other bituminous coal).
2015 - Supply and inland consumption by sector

[Goto Report](#)

Should correspond to those quantities reported in Table 6B of the Annual electricity questionnaire.

Product	Other bituminous coal
Item	Autoproducer CHP plants
Value	83
Product 2	Other bituminous coal
Item 2	Fuel input (kilotonnes)
Value 2	0

[Close](#)

Figure 18: Error

Notifications

When the user has imported and validated the data submission, **the IEA needs to be notified**. A submission will only be considered official after notification.

The Data 360° is used for data notifications. The user can select the submission they wish to send a notification for in the “Notified?” column, and click the notify button.

Do you wish to notify IEA?				Last Modification	Notified?	Nbr. Data Points	Nbr. Warnings	Nbr. Errors
Notify				Mon, 12 Nov 2017 16:19:55	No	218	0	19
Notify remaining years as well? <input checked="" type="checkbox"/>				Fri, 20 Oct 2017 9:58:29	Tue, 07 Nov 2017 11:40:35	196	0	16
Questionnaire: Coal				Tue, 24 Oct 2017 10:26:27	Wed, 29 Oct 2017 09:52:25	960	0	7
Period: 2015				Fri, 20 Oct 2017 09:10:38	Wed, 29 Oct 2017 09:52:25	1040	0	5
Country: [REDACTED]				Mon, 13 Nov 2017 17:35:20	No	4	0	5
Submission: 2017/2018				Wed, 08 Nov 2017 10:51:05	No	106	0	9
				Wed, 08 Nov 2017 10:51:05	Wed, 08 Nov 2017 10:51:05	100	0	7
				Mon, 12 Nov 2017 16:23:18	No	244	0	12
				Mon, 12 Nov 2017 16:23:18	Mon, 12 Nov 2017 16:23:18	249	0	15

Figure 19: Notification

The user can choose to notify for a specific period, or for all periods where data was changed. An email will then be sent to the IEA and to the user that performed the change informing them of a new data submission.

Ivo Letra has completed

Questionnaire: Natural Gas
Country: [REDACTED]
Submission: 2017/2018
Period: 2012

Figure 20: Email

DATA TRANSFERS

Users can submit data manually (see Reports section) or by uploading a csv file. The csv file that is typically uploaded is the file produced by one of the IEA's Excel questionnaires (i.e. Joint Annual Questionnaires, MOS, JODI). The maximum size of a file to be uploaded is 3MB.

Data can also be exported to a csv file with the same structure.

Import data

A user can choose to upload a complete submission (FULL import), or a partial submission (PARTIAL import). A complete submission means that the data submitted in the csv file includes the entire dataset [Country; Questionnaire; Submission, Period], and all non-existing data points are considered to be zero. In a partial submission, only data points present in the file will be modified and the non-existing data points will be untouched.

User	File	Import Type	Message	Start Date	Duration	Size (KB)	Status
[Redacted]	Manual change	Official		2017-11-14 13:28:53	00:00:01	-	Validated Processed
[Redacted]	Manual change	Official		2017-11-14 13:28:39	00:00:00	-	Validated Processed
[Redacted]	Manual change	Official		2017-11-13 17:35:20	00:00:00	-	Validated Processed
[Redacted]	Manual change	Official		2017-11-13 17:34:06	00:00:01	-	Validated Processed
[Redacted]	Manual change	Official		2017-10-26 17:29:44	00:00:01	-	Validated Processed
[Redacted]	Manual change	Official		2017-10-26 16:45:30	00:00:01	-	Validated Processed
[Redacted]	MOSO	Full	Errors found!	2017-10-25 10:20:21	00:00:04	3633	Not Validated Not Processed
[Redacted]	[Redacted]	Full		2016-09-29 16:43:00	00:03:00	-	Validated Processed
[Redacted]	[Redacted]	Full		2016-09-30 13:14:00	00:02:00	-	Validated Processed
[Redacted]	[Redacted]	Full		2014-09-30 13:10:00	00:02:00	-	Validated Processed

Figure 21: Import page

For both FULL and PARTIAL imports, the computed data points will be recalculated even if they are not in the file.

During a file import there are two distinct stages, file validation and data processing. Both stages run asynchronously, and the processes run in the background, therefore not blocking the user for more than a few seconds.

The first stage is validating the file on several domains:

- Is the structure of the csv is correct?
- Does the user have rights to modify a given questionnaire/country?
- Does the Country/Datatype/Product/Item1/Item2 exist?
- Is it a valid cycle/submission?
- Is it a valid period (year or month)?
- Is the figure submitted as an integer?

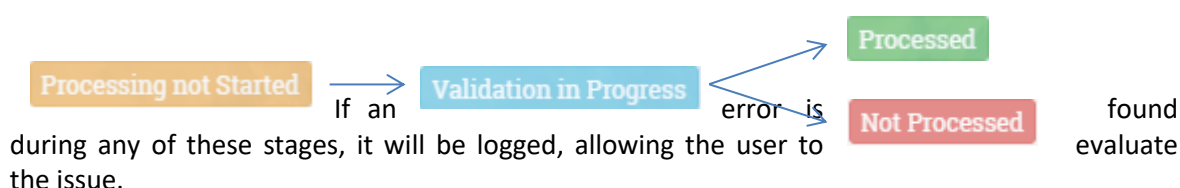
- Are there any duplicates?
- Does the data structure (Country, Questionnaire, Datatype, Product, Item1, Item2) associated with each data point exist?

If every validation is correct, then the status will be *validated*. If not, it will appear as *not validated*.

The second stage refers to **Validated** to **processing**. The data was considered valid in the previous step, therefore the data can now be **Not Validated** computed. Several data points are the result of a formula, so they need to be calculated accordingly. Among several steps, the processing stage executes the following:

- Removes old data
- Removes data that was not submitted and is considered to be zero
- Inserts new data
- Computes calculated figures

At the end of this stage, the status progresses from *processing not started* to *validation in progress*. If everything is correct, the data will be *processed*, while if an error occurs the status will appear as *not processed*.



Errors while importing file (first 15 errors)	
Error(s)	
["Row 19060: BANGLADESH: Information on this country cannot be modified	
"Row 19061: BANGLADESH: Information on this country cannot be modified	
"Row 19062: BANGLADESH: Information on this country cannot be modified	
"Row 19063: BANGLADESH: Information on this country cannot be modified	
"Row 19064: BANGLADESH: Information on this country cannot be modified	
"Row 19065: BANGLADESH: Information on this country cannot be modified	
"Row 19066: BANGLADESH: Information on this country cannot be modified	
"Row 19067: BANGLADESH: Information on this country cannot be modified	
"Row 19068: BANGLADESH: Information on this country cannot be modified	
"Row 19069: BANGLADESH: Information on this country cannot be modified	
"Row 19070: BANGLADESH: Information on this country cannot be modified	
"Row 19071: BANGLADESH: Information on this country cannot be modified	
"Row 19072: BANGLADESH: Information on this country cannot be modified	
"Row 19073: BANGLADESH: Information on this country cannot be modified	
"Row 19074: BANGLADESH: Information on this country cannot be modified"]	
Close	

Figure 22: Data import error log

Export data

The user can export his or her country’s data to a csv file by applying a specific filter. One file per questionnaire, country and submission but for multiple periods can be generated.



Figure 23: Export data

If data exists for that specific filter, the file will be available for download.

APPENDIX

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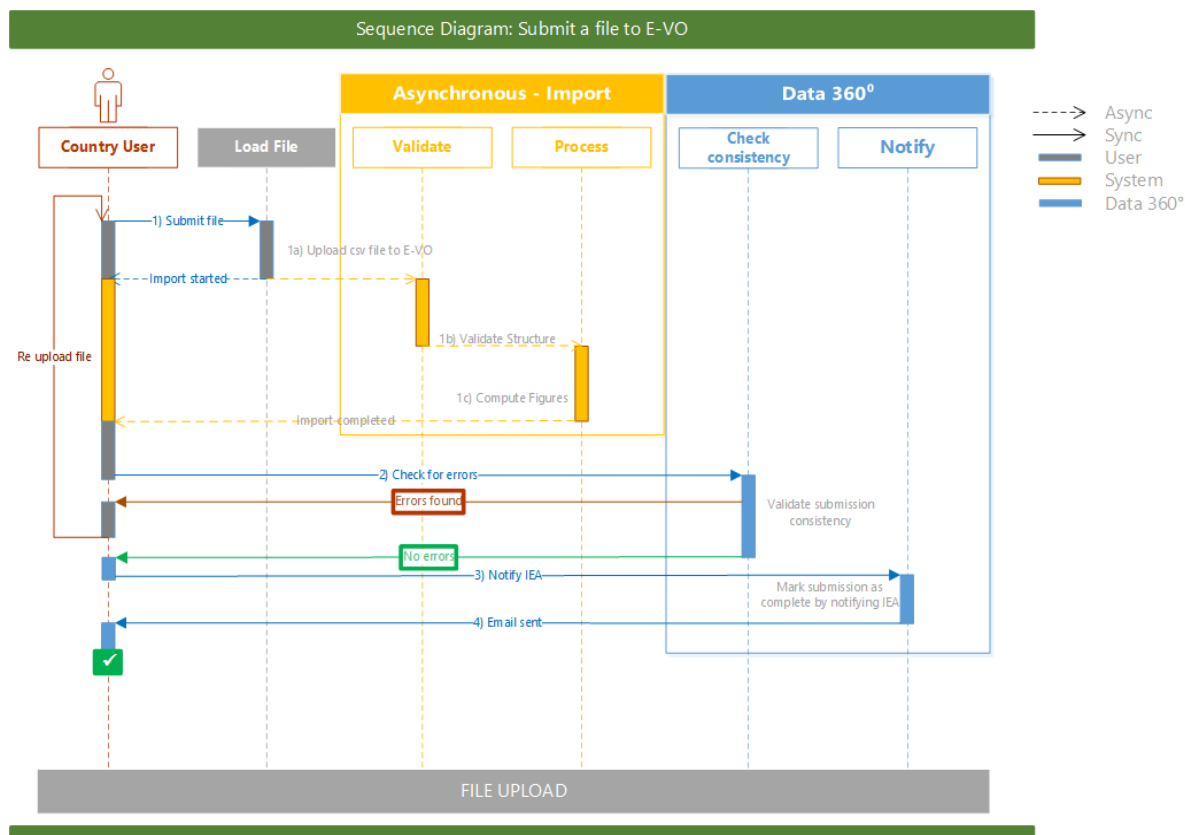


Figure 24: Sequence diagram

The figure above is a Sequence diagram describing the process of importing and validating a data submission to E-VO.

The sequence can be summarised as follows:

- 1) Submitting the data: The country user uploads a csv file to E-VO. The system performs the import in two asynchronous stages – validation and processing. When the file structure is validated and calculated figures are computed, the file import is complete.
- 2) Validating the submission: After the file is imported, the country user should proceed to the Data 360° to check the consistency of the submission. If errors are found, the user should fix the errors with manual changes or by importing a new csv file. If no errors are found, the user can continue to the notification stage.
- 3) Notifying the IEA: Once a data submission is checked and validated in the Data 360°, the country user needs to mark the submission as complete by notifying the IEA.
- 4) Sending the email: The notification process sends an email to the IEA, as well as to the country user for confirmation. The process is complete.