

IPCC Inventory Software Development

IPCC Inventory Software Workshop, Baku 2024

IPCC TFI-TSU





Outline

Framework

- ✓ IPCC TFI long-term commitment
- ✓ Software Architecture
- ✓ Supporting
- **Goals, Requests and Constraints**

Operations

- ✓ Servicing
- ✓ Upgrading
- ✓ Supporting

Planning

Resources



Framework: IPCC TFI long-term commitment

- □ to keep **developing the** IPCC Inventory **Software** for the calculation and reporting of national GHG emissions and removals
- to support the use of the IPCC Inventory Software, including through additional tools
- **Constrained by resource availability**



Framework: Software Architecture

□ IPCC Inventory Software is built on *Microsoft Access Database* (ACE OLEDB 12)

- Requires Microsoft .NET Framework 4.6.2+ for running the application (which is part of Windows 10 or later; or available via Windows Update for older versions of Windows starting from Windows 7 SP1)
- Database is accessed through Login and Password credentials, either assigned at first run of a blank database or assigned by a Superuser when sharing the database
- □ There is not a mechanism for *Login* or *Password* retrieval, although a *hint* can be drafted by users to help in recalling those



Framework: Software Architecture

- □ The *Software* runs in WindowsOS only, preferably Windows 11
- New versions of the Software can open databases set by previous versions, and thus ensure that data entered are retained for use in the new version
- □ XML export/import files have no compatibility with versions of the *Software* released before and after the version used to generate those files
- Shared databases work in an intranet cloud only [Googledrive causes data losses, SharePoint and Onedrive do not work]



Goals for the Best Inventory Software

COMPREHENSIVE ACCURATE AND CONSISTENT IMPLEMENTATION & COVERAGE

- ✓ allow implementation of every IPCC methodology, while avoiding methodological errors,
- ✓ allow reporting Tier 3 user-specific estimates, as well as preparing estimates at subnational aggregation
- ✓ complete coverage of sinks & sources, with GHG estimates consistent across the time series
- ✓ minimizes data entry errors
- ✓ support the use of best EFs & ancillary parameters

SECURE & TRANSPARENT DATA MANAGEMENT

- ✓ store all information in a single database with security (*Login*&*Password*, backup functionality)
- ✓ transparently inform reporting on methods and data used

INTEROPERABILITY & COLLABORATION

- $\checkmark\,$ full interoperability with the UNFCCC ETF reporting tool
- ✓ allow multiple users co-work

Overall easy to use



Requests by users

COMPATIBILITY & INTEGRATION

- ✓ MacOS compatible
- \checkmark integrated with country-specific data collection tools
- ✓ Extend to 2019 Refinement data and methods
- \checkmark Allowing user-specific units for fuel combustion together with conversion units

DATA ENTER & CO-WORKING

- $\checkmark\,$ allows multiple users co-work via internet
- \checkmark reading excel-based tools
- $\checkmark\,$ be usable for projections & mitigation tracking
- ✓ data enter for land representation with approach 2 done through land matrices
- $\checkmark\,$ auto-save of data entered
- ✓ Precompile the field "subdivision" with "unspecified" in each calculation worksheet

SUPPORT

Help desk open to users' contributions, and with FAQs and Tips for troubleshooting



Requests by users

QUALITY CONTROL & ERROR MANAGEMENT

- ✓ CRT information to be downloadable for QA/QC activities, as per IPCC good practice
- ✓ Additional QC checks to automatically control editorial errors in data entered
- ✓ make IPCC default values rightly identifiable
- ✓ Password recovery

DATA OUTPUTS & REPORT

- ✓ multi-year inventory results by sectors/categories/gases, as well as in CO_{2eq}
- ✓ import/export entire time series
- ✓ Graphical plot of Reference Approach vs Sectoral Approach over multiple years
- ✓ Allow to enter totals in reporting tables when a country-specific method is applied (for reporting under the UNFCCC as well as for KCA)
- ✓ Reporting with subnational aggregations

VIEWS

✓ Increase the area of the main window, make fixed the orders of TAB in a category



Constraints

Technical:

INTEROPERABILITY & COMPATIBILITY

✓ Interoperability subject to the **development of the UNFCCC ETF reporting tool**

 \checkmark Coding incompatible with MacOS

DATA MANAGEMENT

- ✓ Data import/export are limited to AD and EFs (and ancillary parameters)
- ✓ CRT data import not supported
- ✓ Can manage only one database at time

Resources:



Progress in Software's development

TSU working on:

- ✓ Uncertainty Analysis: expanding Approach 1, implementing Approach 2
- ✓ **Key Category Analysis**: implementing Approach 2, mimicking UNFCCC flexibility
- ✓ Land representation tool: ?

IT company working on:

- ✓ Interoperability with UNFCCC ETF reporting tool
- ✓ Data Import/Export
- ✓ Additional data manager tools
- ✓ More significant Category-specific improvements



Operations: Servicing

The IPCC TFI TSU services the IPCC Inventory Software through:

- ✓ Working on *Software*'s upgrades, according to plans
- ✓ Providing support to users
- ✓ Maintain the Software app efficient, by removing any errors identified and upgrading the architecture according the aging of the code

Servicing on errors Errors shall always be communicated to TSU (email) (email)

Errors by users in the installation/use of the Software

directly addressed by answering the email

✓ **Bugs** in the Software,

- I. TSU identifies the bug based on the information provided by users (IT company may cooperate)
- II. TSU works on an upgrade of the Software to remove the bug (IT company may cooperate)
- III. IT company produces an error-free exe file

I., II, III. occur within 1 week

IV. Users that signaled the error are offered to test the new exe



Operations: Upgrading

The IPCC TFI TSU continuously work on upgrades according to:

- ✓ IPCC Guidance in the **2006 IPCC Guidelines**
- ✓ IPCC Guidance in the **2013 Wetlands Supplement**
- ✓ UNFCCC reporting requirements under the Paris Agreement
- ✓ Requests by users to make the Software more efficient

Upgrading requires:

- ✓ Drafting specifications (*Tsu* with feedback from the IT company)
- ✓ Simulation of upgraded worksheets (*Tsu*, where needed)
- ✓ Testing (*TSU*, including external support where available)
- ✓ Resource allocation (*TSU*, subject to additional funding availability)



Operations: Upgrading

Coming upgrades include:

- ✓ Addition of an allocation tool for F-gases in the IPPU sector (to support completeness and accuracy)
- ✓ Addition of an allocation tool for Solid Waste (categories 4.A., 4.B, 4.C as per Chapter 2, Volume 5)
- ✓ Timeseries export/import
- ✓ Having CRT Flex_Summary downloadable in an excel format
- ✓ Subnational level, multiuser co-work as well as import/export



Operations: Supporting

□ The IPCC TFI TSU provides support to users as:

- ✓ **production** of tools, guidebooks, courses
- ✓ participation to international activities to sustain the use of the Software by UNFCCC countries
 - CBIT-GSP (UNEP)
 - > ICAT (UNOPS)
 - FAO (FRA)
 - UNFCCC secretariat (ghg_capacity_building team)
- ✓ Help desk, addressing any questions from users, including on potential errors
- ✓ **Organization** of an annual meeting/workshop to collect feedback from users



Planning

□ The IPCC TFI TSU is planning to:

- ✓ Complete upgrades
 - > Uncertainty Analysis
 - **Key Category Analysis**
 - Revision of IPCC reporting tables
- ✓ Develop additional support material as
 - > PPTs on the use of the Software: theory basis and exercises description
 - > Videos of data entry procedure for most relevant categories, at various tiers

✓ Long-term plan

- Designing a new version of the Software:
 - consistent with current Goals
 - MacOS compatible

Challenges

- Resource needs
- ✓ Time allocation



Resources

Resource needs for the **annual operations in 2025**, as described, amount to:

- ✓ Financial resources
 - Around 500,000 USD (of which, 50,000 CHF provided by IPCC)
 - Additional contributions needed
- ✓ Human resources
 - ✓ Various TSU staff up to 2 man-year (600 man-day)
 - ✓ 1 consultant
- **Resource needs for long-term plan**:
 - ✓ Financial resources (preliminary judgement, over a three-year period)
 - Around 3,000,000 USD
 - No funding available
 - ✓ Human resources (preliminary judgement, annual)
 - ✓ Various TSU staff up to 1 man-year (300 man-day)
 - ✓ 1 consultant



THANK YOU FOR YOUR ATTENTION

STAY IN TOUCH



ipcc-nggip.iges.or.jp/software/index.html



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Any further questions?

STAY CONNECTED

- X ipcc_ch
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