IPCC Inventory Software: Overview

IPCC TFI Side-event at UNFCCC COP-25 Chile

IPCC Pavilion

Madrid, Spain

10 December 2019

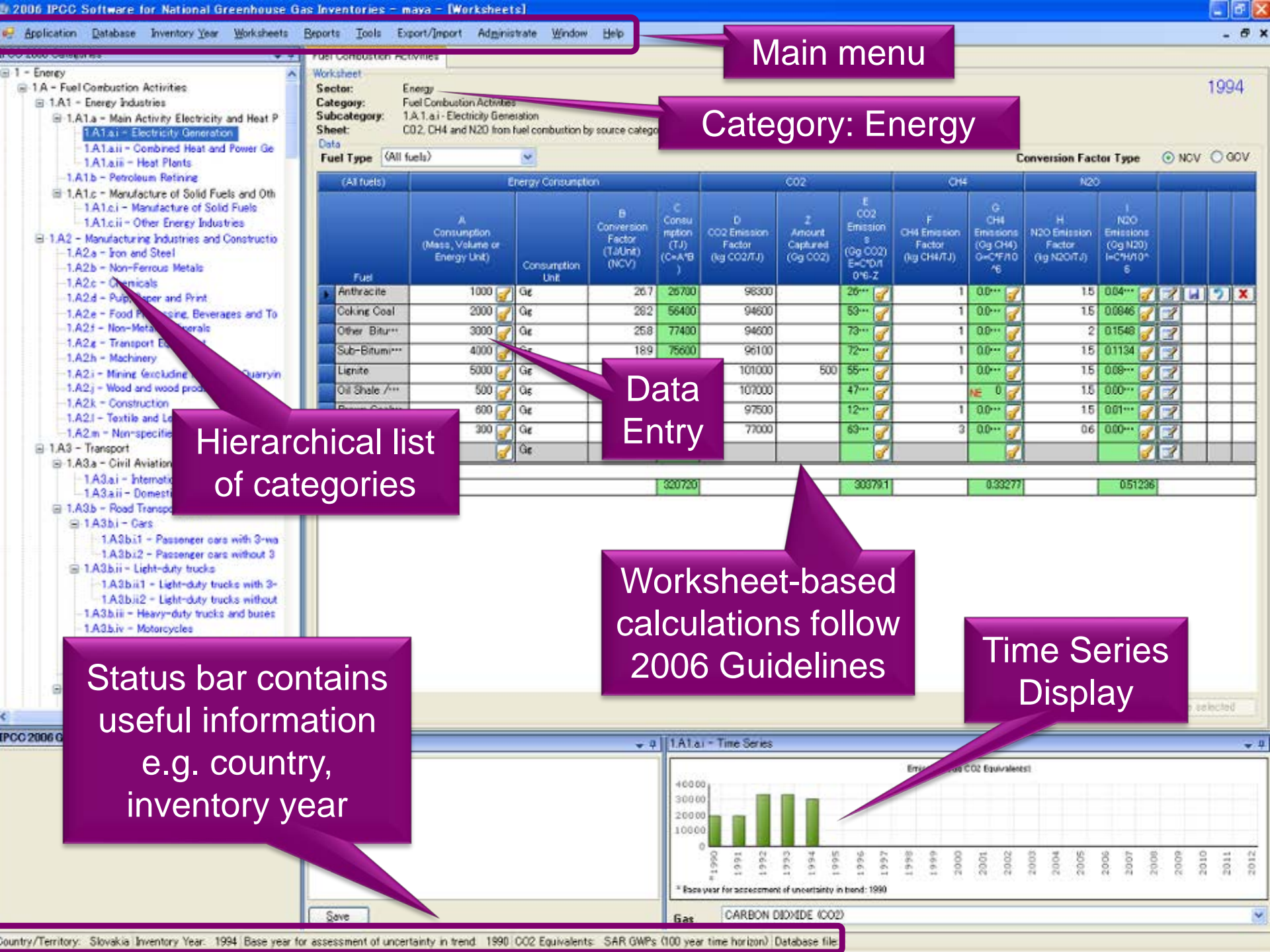*Pavel Shermanau, IPCC TFI TSU*

Outline

o Background

o Status

o Plans

Background

o *IPCC Inventory Software* is one of the products of the IPCC Task Force on National Greenhouse Gas Inventories (IPCC TFI) together with Methodology reports, EFDB and others

o The software implements the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (*2006 IPCC Guidelines*)

o Originally only Tier 1 Worksheets of the *2006 IPCC Guidelines* were implemented

o The software was launched in 2012. The latest version published is Version 2.69, which was released on October, 25, 2019

Background

o The software can be downloaded from **IPCC TFI** web-site (for free): *http://www.ipcc-nggip.iges.or.jp/software/index.html*, and it comes in .exe file of 42.5 MB to be installed

o It runs on Windows Microsoft OS only

o The database is password protected and a hint to recover the password is to be provided *(otherwise, once the password lost, the database cannot be recovered by a user)*

o Non-English User Manual is available in addition to the official English version:
- French version *(translated by Government of Belgium)*
- Arabic version *(translated by Sidati Ould Dah Ould EIDA, CCPNCC, Mauritania)*

2006 IPCC Software for National Greenhouse Gas Inventories – maya – [Worksheets]

Application   Database   Inventory Year   Worksheets   Reports   Tools   Export/Import   Administrate   Window   Help

Main menu

Category: Energy

Worksheet
Sector: Energy
Category: Fuel Combustion Activities
Subcategory: 1.A.1.a.i - Electricity Generation
Sheet: CO2, CH4 and N2O from fuel combustion by source catego

Data
Fuel Type (All fuels)

Conversion Factor Type   ⊙ NCV   ○ GCV

1994

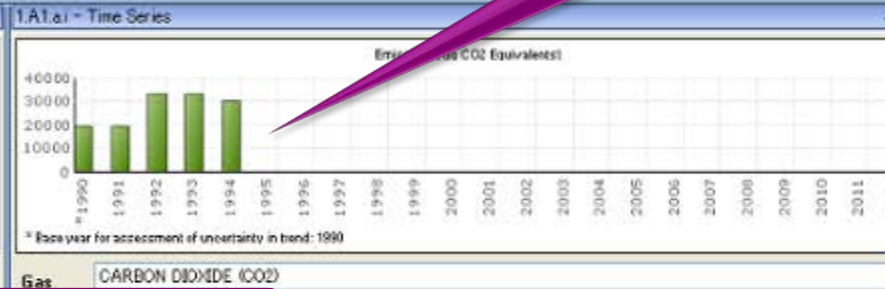|	(All fuels)		Energy Consumption			CO2		CH4		N2O				
Fuel	A Consumption (Mass, Volume or Energy Unit)	Consumption Unit	B Conversion Factor (TJ/Unit) (NCV)	C Consumption (TJ) (C=A*B)	D CO2 Emission Factor (kg CO2/TJ)	Z Amount Captured (Gg CO2)	E CO2 Emission s (Gg CO2) E=C*D/1 0*6-Z	F CH4 Emission Factor (kg CH4/TJ)	G CH4 Emissions (Gg CH4) G=C*F/10 ^6	H N2O Emission Factor (kg N2O/TJ)	I N2O Emissions (Gg N2O) I=C*H/10^ 6			
Anthracite	1000	Gg	26.7	26700	98300		26···	1	0.0···	1.5	0.04···			
Coking Coal	2000	Gg	28.2	56400	94600		53···	1	0.0···	1.5	0.0846			
Other Bitu···	3000	Gg	25.8	77400	94600		73···	1	0.0···	2	0.1548			
Sub-Bitumi···	4000	Gg	18.9	75600	96100		72···	1	0.0···	1.5	0.1134			
Lignite	5000	Gg			101000	500	55···	1	0.0···	1.5	0.08···			
Oil Shale /···	500	Gg		107000			47···		NE 0	1.5	0.00···			
Brown Coke···	600	Gg			97500		12···	1	0.0···	1.5	0.01···			
	300	Gg		77000			63···	3	0.0···	0.6	0.00···			
		Gg												
				320720			303791		0.33277		0.51236			

Hierarchical list of categories

Data Entry

Worksheet-based calculations follow 2006 Guidelines

Time Series Display

Status bar contains useful information e.g. country, inventory year

1 - Energy
  1.A - Fuel Combustion Activities
    1.A1 - Energy Industries
      1.A1.a - Main Activity Electricity and Heat P
        1.A1.a.i - Electricity Generation
        1.A1.a.ii - Combined Heat and Power Ge
        1.A1.a.iii - Heat Plants
      1.A1.b - Petroleum Refining
      1.A1.c - Manufacture of Solid Fuels and Oth
        1.A1.c.i - Manufacture of Solid Fuels
        1.A1.c.ii - Other Energy Industries
    1.A2 - Manufacturing Industries and Constructio
      1.A2.a - Iron and Steel
      1.A2.b - Non-Ferrous Metals
      1.A2.c - Chemicals
      1.A2.d - Pulp, Paper and Print
      1.A2.e - Food Processing, Beverages and To
      1.A2.f - Non-Metallic Minerals
      1.A2.g - Transport Equipment
      1.A2.h - Machinery
      1.A2.i - Mining (excluding ... Quarryin
      1.A2.j - Wood and wood prod...
      1.A2.k - Construction
      1.A2.l - Textile and Le...
      1.A2.m - Non-specific...
    1.A3 - Transport
      1.A3.a - Civil Aviation
        1.A3.a.i - Internatio...
        1.A3.a.ii - Domesti...
      1.A3.b - Road Transpor...
        1.A3.b.i - Cars
          1.A3.b.i.1 - Passenger cars with 3-wa
          1.A3.b.i.2 - Passenger cars without 3
        1.A3.b.ii - Light-duty trucks
          1.A3.b.ii.1 - Light-duty trucks with 3-
          1.A3.b.ii.2 - Light-duty trucks without
        1.A3.b.iii - Heavy-duty trucks and buses
        1.A3.b.iv - Motorcycles

IPCC 2006 G

Save

1.A1.a.i - Time Series

Emis... ...ng CO2 Equivalents)

40000
30000
20000
10000
0

1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

* Base year for assessment of uncertainty in trend: 1990

Gas   CARBON DIOXIDE (CO2)

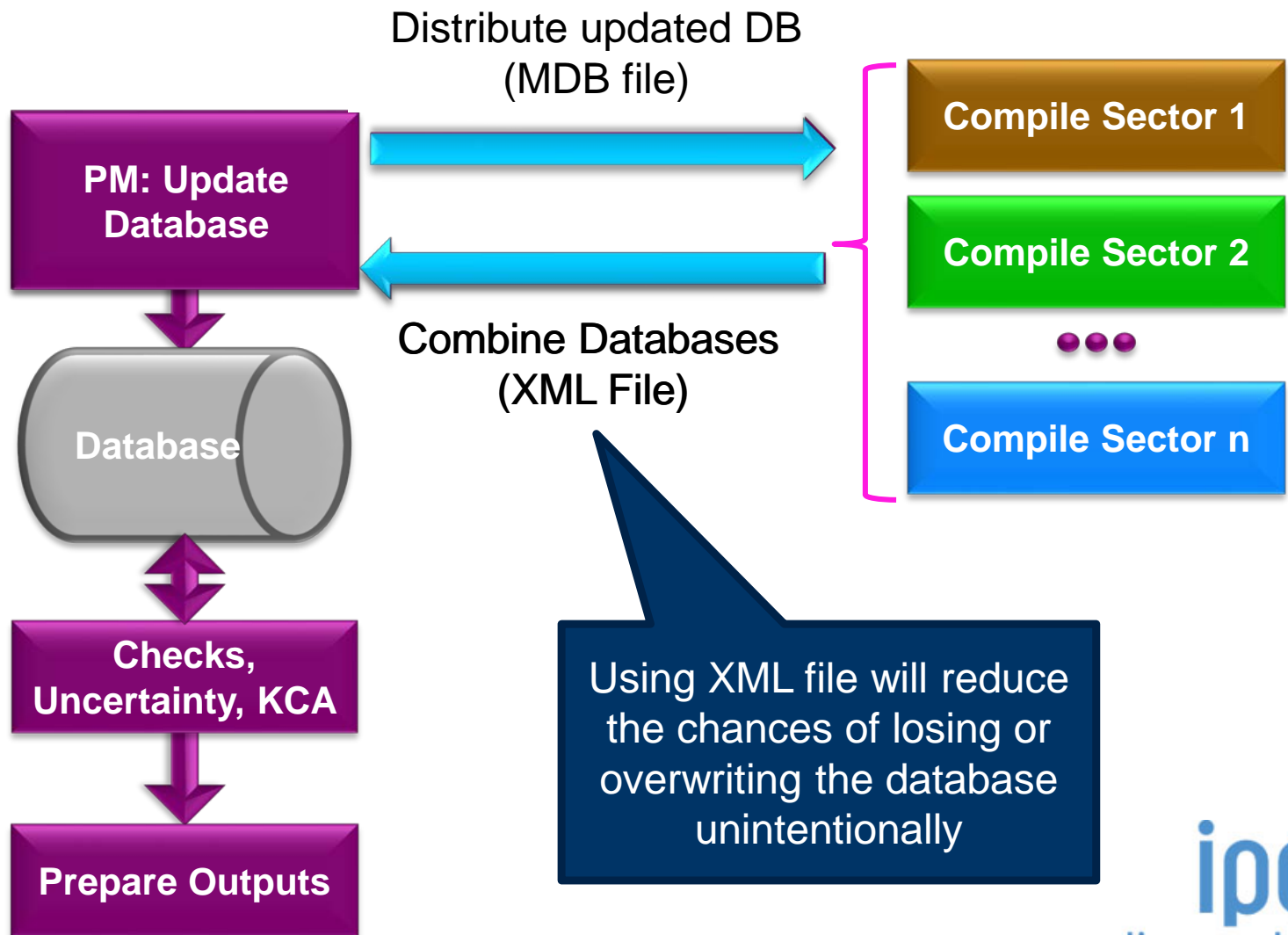# Software Functions

An Example - Export

Status

The IPCC Inventory Software aims to assist inventory compilers in using the IPCC Guidelines:

o it can be used for the whole inventory or just individual categories, allows different sectors of the inventory to be developed simultaneously, provides default data from the *2006 IPCC Guidelines*, but gives users the flexibility to use their own country-specific information

o it can be used when reporting outputs in non-Annex I National Communications format *(reporting tables, consistent with Tables 1 and 2 in Annex to Decision 17/CP.8)*

o although it was designed to implement Tier 1 methods and to follow the Worksheets of the *2006 IPCC Guidelines*, the latest version 2.69 allows to perform Tier 2 for majority of categories in Energy, IPPU, Waste and Agriculture

Multiple Users

Project manager

Sectoral Expert(s)

Distribute updated DB
(MDB file)

PM: Update Database

Combine Databases
(XML File)

Database

Checks, Uncertainty, KCA

Prepare Outputs

Compile Sector 1

Compile Sector 2

Compile Sector n

Using XML file will reduce the chances of losing or overwriting the database unintentionally

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INTERGOVERNMENTAL PANEL ON climate change
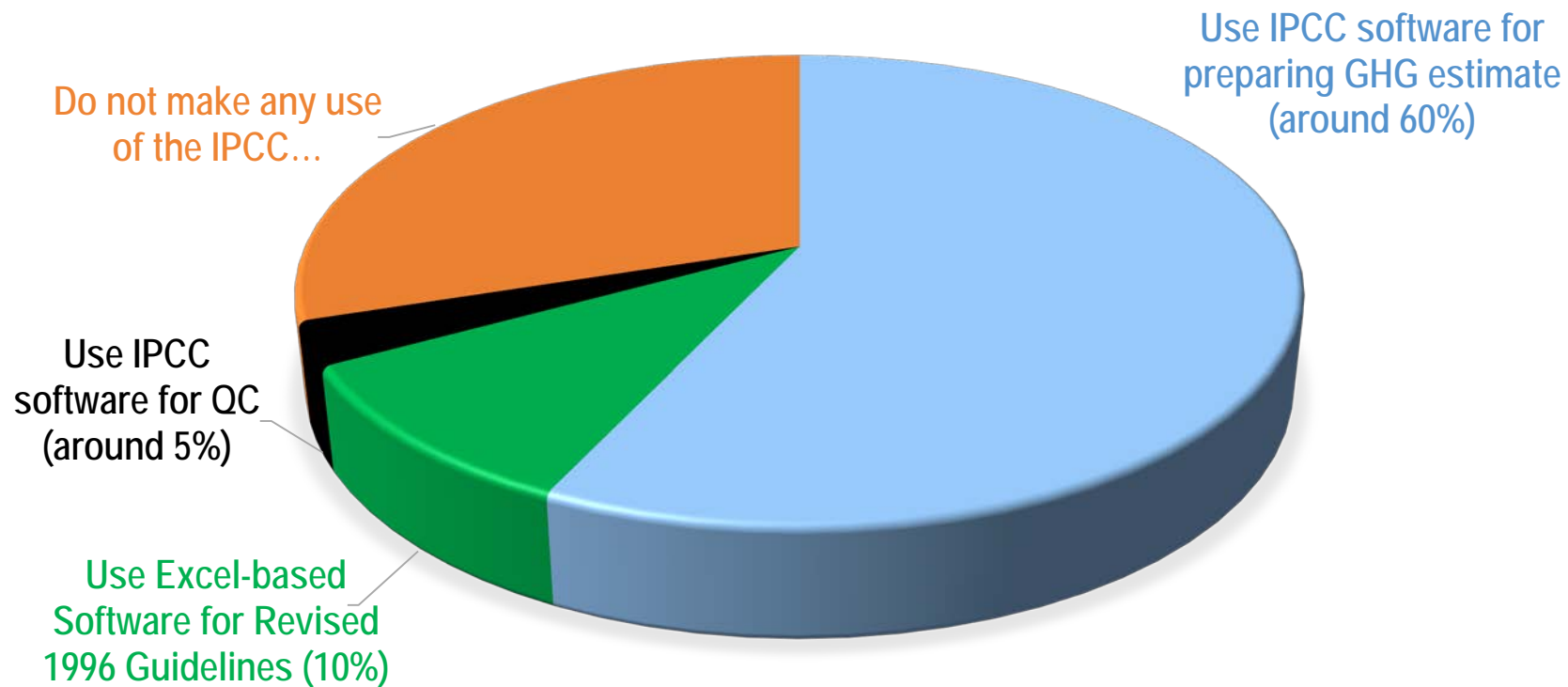
Usage of IPCC Inventory Software by countries

STATISTICS FROM 60 DEVELOPING COUNTRIES SAMPLED
FROM THE UNFCCC TRAINING WORKSHOPS ON NGHGI
(QUESTIONNAIRE)

Do not make any use of the IPCC…

Use IPCC software for preparing GHG estimate (around 60%)

Use IPCC software for QC (around 5%)

Use Excel-based Software for Revised 1996 Guidelines (10%)

Plans *(subject to resource availability)*

IPCC TFI is planning to implement the following:

- Implementation of all Tier 2 methods for all sectors. Currently the work is going on AFOLU Sector

  (3C *by February (Beta version)* then 3 B, including Wetlands Supplement)

- Tier 2 approaches for Key categories analysis and Uncertainty analysis

- Few higher tier equations in Energy, IPPU and Waste

- Add-on for Approach 3 on Land Representation

- Time series and reporting

- Translation to the 6 UN languages

Plans *(subject to resource availability)*

o Further the software will allow:

- Work of multiple users within the same sector/category (e.g. for different states, provinces, projects within the NGHGI)
- Tier 3 estimates input, i.e. AD and GHG emissions in reporting tables

o TSU has established a pool of testers *(voluntary and free participation)* to support the software development

o The annual meeting on the software will focus on feedbacks from users as well as on specific-cases where support is needed or a revision of the software is envisaged

Plans *(subject to resource availability)*

o A guidebook on step-by-step data input in the software and on general functions and reporting *(to be drafted)*

o Additional tools to support inventory compilers:

- MS Excel-version of the inventory worksheets for all IPCC equations
- Land representation tools
- …upon users feedbacks

o A series of video tutorials on software usage, including:

- How-to videos aimed at explaining main features of the software
- Moderated guided tours to raise public awareness on the software
- Interactive tutorials for a user doing exercises with results' checks

UNFCCC Context

New Common Reporting Format/Tables under the Paris Agreement

o The structure: *Each Party shall use the 2006 IPCC Guidelines* (Decision 18/CMA.1)

o The reporting tables/format is under discussion now and it should be agreed by the Parties (Agenda item 11(a))

Reports in the Software

Report	Level	Contents
Summary	1.A.1	Emissions
Short summary	1.A	Emissions
Sectoral	1.A.1.a.ii (most disaggregated level)	Emissions
Background	1.A.1.a.ii (most disaggregated level)	Activity data, Emissions

Note: *All reports can be exported as MS Excel file*

Similar to CRF Tables, but without IEF

Reporting

o In this context, IPCC TFI plans to enhance the *IPCC Inventory Software* with possibility to produce all outcomes of estimates in <u>*XML format*</u>, which then can be utilized by any new reporting framework/ infrastructure

o IPCC TFI will continuously provide methodological support and will work together with UNFCCC Secretariat to address issues regarding the IPCC Inventory Software

Thank you

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WMO UNEP