Introduction of National GHG inventory in China

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目录

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1.1 Submission Status of China's GHGI

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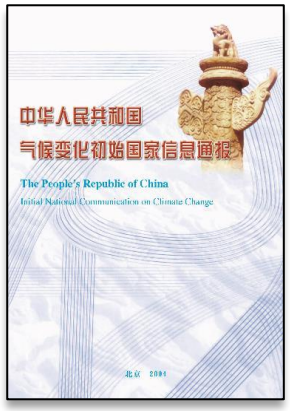
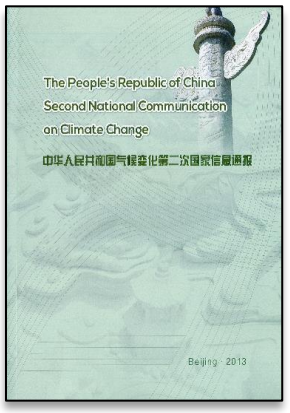
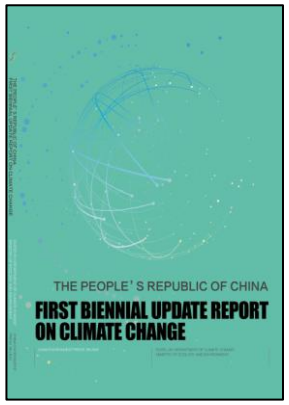
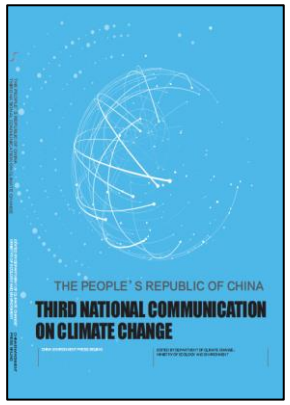
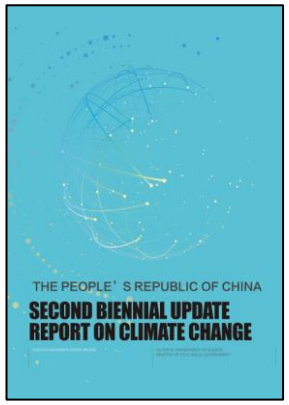
INC (2004.12)	SNC (2012.11)	BUR (2016.12)	TNC/2BUR (2018.12)	4NC/3BUR (2023.12)	4BUR/1BTR (2024.12)
• GHGI of 1994	• GHGI of 2005	• GHGI of 2012	• GHGI of 2010 • Recalculation of 2005 • GHGI of 2014	• GHGI of 2017&2018 • Recalculation of 2005	• GHGI of 2020-2021 • Recalculation of 2005, 2010, 2012, 2014, 2017 and 2018

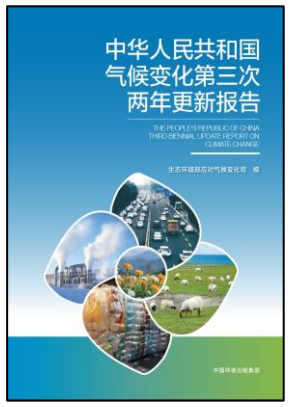




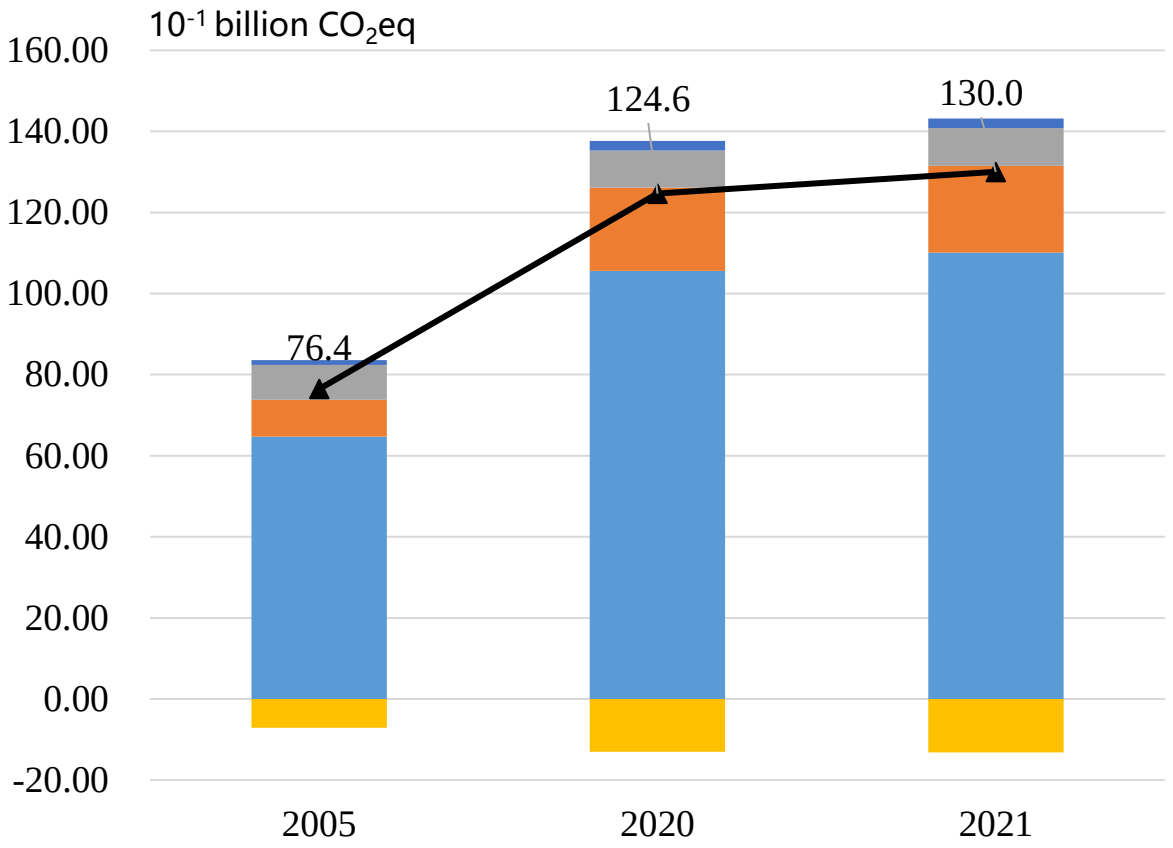


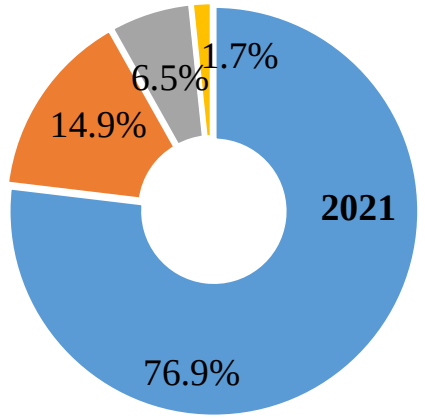


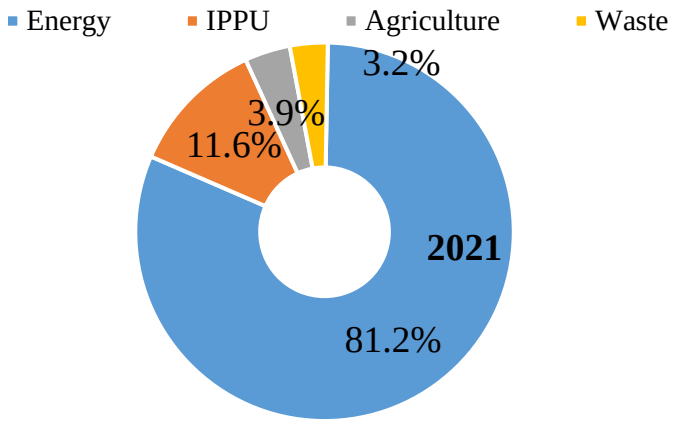




1.2 National GHG Emissions and Removals







能源活动 energy
农业活动 agriculture
废弃物处理 waste
工业生产过程和产品使用 IPPU
土地利用、土地利用变化和林业 LULUCF
总量（包括LULUCF） Total(with LULUCF)

二氧化碳 CO_2
甲烷 CH_4
氧化亚氮 N_2O
含氟气体 F-gas
without LULUCF

2.1 The workflow

Jan-Mar
Based on previous experience, clarify the scope of GHGI and basic data

Apr-Jun
data collection and compilation of GHGI

Jul-Sep
QA/QC, expert review, approval by the competent department

Oct-Dec
Opinion soliciting

Submit to the Secretariat of UNFCCC for approval by the State Council

1 Analyzed the MPGs to set the **outline** of the 1BTR

2 **Listed the information** needed and check the availability of the information

3 **Identified the gap** and prepared the information collection guideline/list

2.1 Institutional Arrangements

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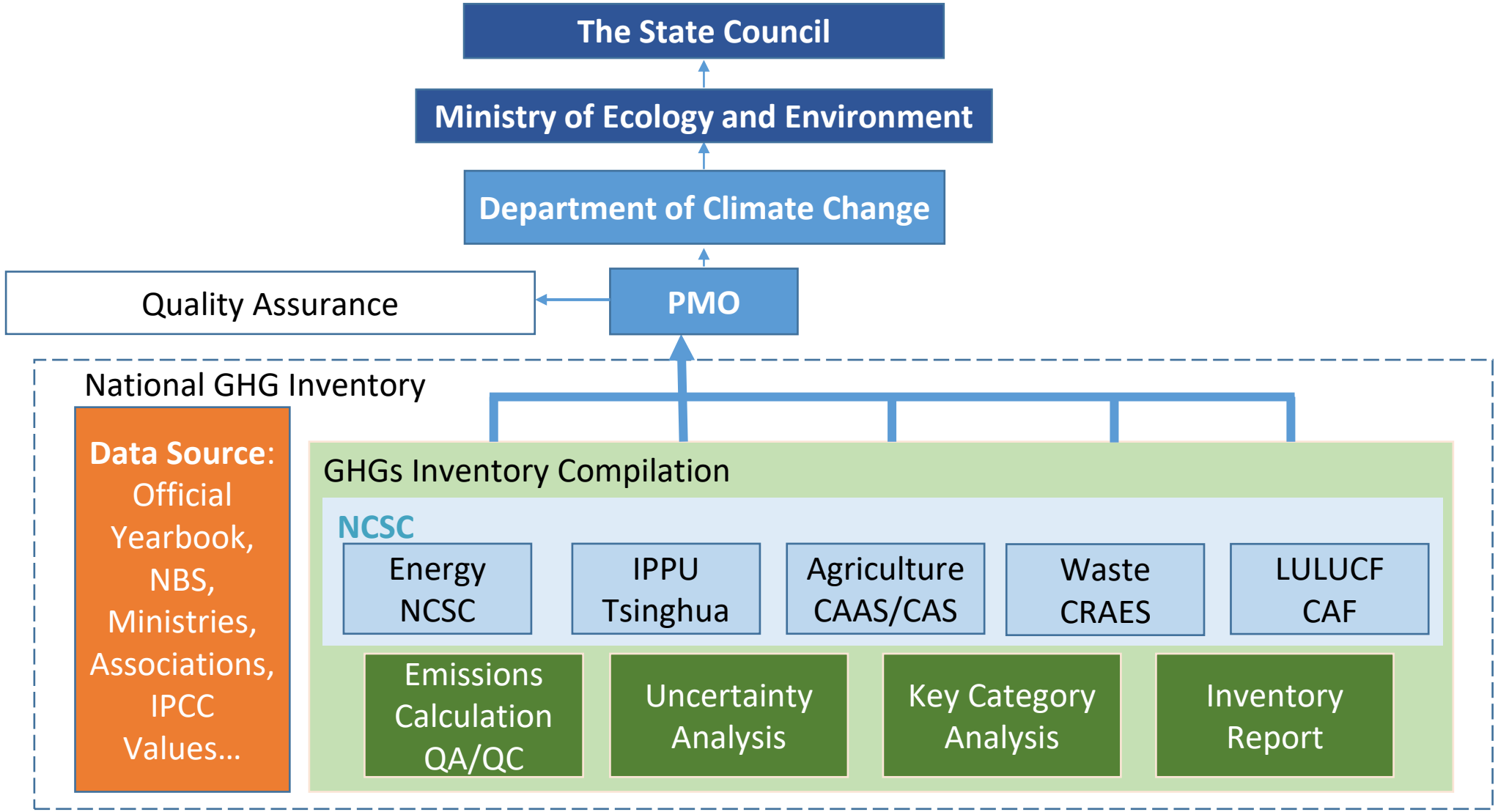

2.2 Technical analysis of the previous BUR

	National GHG inventory
good practices	✓ Detailed description of the methodology ✓ Clearly information on the international bunker fuels ✓ Further upgraded the method
Suggestion	• time series GHGI • Detailed analysis of the differences between the reference approach and the sectoral approach Transparency of EFs

Improvement Plan

- Developing a time-series GHGI
- Detailed GHGI report
- Explain the reasons for the differences between the reference approach and the sectoral approach
- According to the enhanced transparency framework, CRTs are adopted to improve the transparency of emission

2.2 ETF of Paris Agreement

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Cancun Agreements (1/CP.16) and Durban Outcomes (2/CP.17)

Paris Agreement Article 13; decision 18/CMA.1

BUR	BTR
■ Revised 1996 IPCC Guidelines ■ Latest mandatory inventory year (T-4 or later) ■ Activity data should be updated ■ Reporting at a summary level ■ Key category analysis should be done ■ Limited reporting on institutional arrangements (e.g. archiving, inventory as a continuous process) ■ No specific requirements on QA/QC ■ Shall report CO_2, CH_4 and N_2O (using SAR GWP values); encouraged to report other gases ■ Should quantitively estimate uncertainty	■ 2006 IPCC Guidelines ■ Latest mandatory inventory year T-2 (flexibility - T-3*) ■ GHG inventory reporting includes national inventory document and common reporting tables (CRT) ■ Recalculations of previous data required ■ Key category analysis required (contains flexibility*) ■ Reporting on institutional arrangements required ■ Shall develop and implement a QA/QC plan (with flexibility*) ■ Shall report basket of 7 gases (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3) based on para 48 of annex to 18/CMA.1 using AR5 GWP values (contains flexibility*) ■ Shall quantitatively estimate uncertainty (contains flexibility*)

2.2 Challenge from Paris Agreement requirement

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- **Institutional arrangement**
  - Lack of effective coordination among ministries
  - GHG database system is still under construction, so information archive needs to be improved
  - Time-series GHG inventory need a good data foundation
  - QA/QC procedure varies among different sectors
- **Reporting**
  - Higher reporting frequency brings challenges
- **Usage of 2006 GLs and CRT**
  - Some sector (non-energy use) is related to institutional arrangement
  - methodologies is different from 1996 GLs
  - Data collection needs to be rearranged
  - Capacity building for domestic experts
- **Technical Expert Review**

2.3 Institutional Arrangements

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Category	Responsible Organization(s)	Other organizations involved
Energy	NCSC	ERI, TSU, China Building Materials Federation (CBMF), China Petroleum and Chemical Industry Federation (CPCIF), China Metallurgical Industry Planning and Research Institute (CMIPRI), China Nonferrous Metals Industry Association (CNMIA), China National Petroleum Corporation (CNPC), China Petrochemical Corporation (Sinopec), China National Offshore Oil Corporation (CNOOC), Shaanxi Yanchang Petroleum Group, and China Oil and Gas Pipeline Network Corporation (PipeChina).
IPPU	TSU, FECO, and Suzhou Innovation Research Institute (SIRI) of Beihang University	CBMF, CPCIF, CMIPRI, and CNMIA.
Agriculture(Livestock)	IEDA	National Animal Husbandry Station, Animal Husbandry Stations in major livestock production provinces, China Agricultural University, Henan Agricultural University, and Inner Mongolia Agricultural University.
Agriculture (Crop)	IAP	Rural Energy and Environment Agency (REEA) under the Ministry of Agriculture and Rural Affairs, IEDA, Satellite Application Center for Ecology and Environment (SACEE) under the Ministry of Ecology and Environment, and Institute of Agricultural Resources and Regional Planning (IARRP) under the Chinese Academy of Agricultural Sciences.
LULUCF	IFEEP and Land Consolidation and Rehabilitation Center (LCRC) under the Ministry of Land and Resources	Forestry and Grassland Inventory and Planning Institute (FGIPI) under the National Forestry and Grassland Administration, China Aero Geophysical Survey & Remote Sensing Center for Land and Resources (AGRS), Institute of Ecosystem Protection and Restoration (IEPR) under the CAS, Research Institute of Forestry (RIF) under the CAS, Resources Information Institute (RII) under the CAS, and IEDA.
Waste	CRAES	Research Center for Eco-Environmental Sciences (RCEES) under the CAS, ESEC, China Urban Construction Design & Research Institute, SACEE, China National Environmental Monitoring Centre (CNEMC), Institute of Urban Environment (IUE) under the CAS, Guangzhou Institute of Energy Conversion (GIEC) under the CAS, Institute of Process Engineering (IPE) under the CAS, Institute of Rock and Soil Mechanics (IRSM) under the CAS, TSU, RUC, Beijing Normal University (BNU), China Everbright Environment Group Limited, and Beijing Enterprises Water Group Limited.

2.4 Reporting Scope

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GHG species：CO_2、CH_4、N_2O、HFCs、PFCs and SF_6

Energy

- fuel combustion
- fugitive emissions
- carbon dioxide transport and storage

IPPU

- mineral industry
- chemical industry
- metal industry
- non-energy products from fuels and solvent use
- electronics industry
- product uses as substitutes for ODS
- other product manufacture and use

Agriculture

- enteric fermentation
- manure management
- rice cultivation
- agricultural soils
- field burning of agricultural residues

Waste

- solid waste disposal
- biological treatment
- wastewater treatment
- incineration

LULUCF

- forest lands
- croplands
- grasslands
- wetlands
- settlements
- other lands
- harvested wood products

2.4 Reporting Guideline

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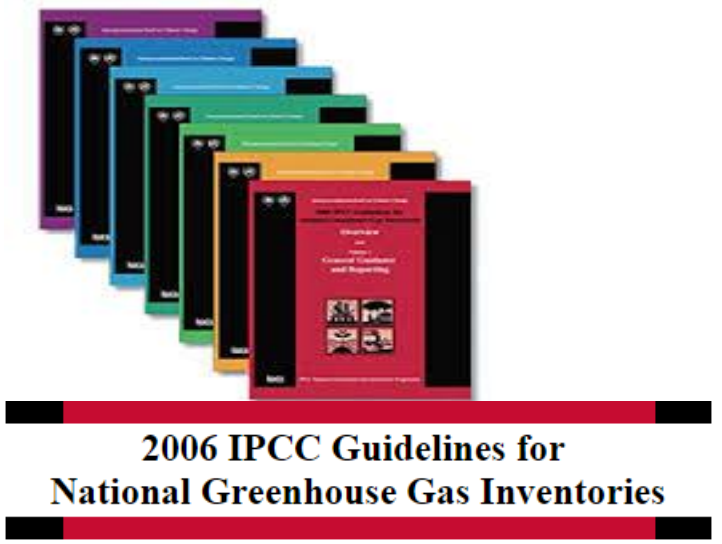
- 17/CP8，Non-Annex I Parties **should** use the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
- Non-Annex I Parties are encouraged to apply the IPCC good practice guidance, taking into account the need to improve transparency, consistency, comparability, completeness and accuracy in inventories

- Each Party **shall** use the 2006 IPCC GLs, and shall use any subsequent version or refinement of the IPCC GLs agreed upon by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement.

Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories

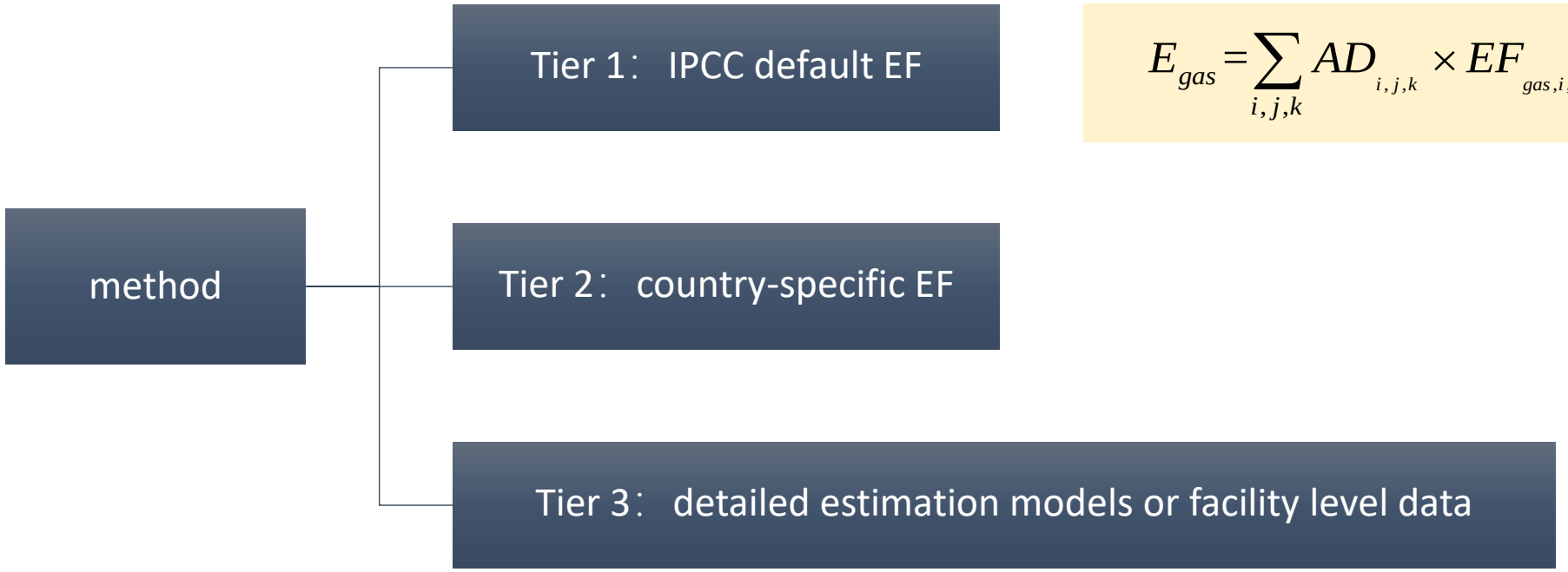
Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories

Good Practice Guidance for Land Use,Land-Use Change and Forestry



For better technical and capacity-building preparation of the compliance requirements, the methodology adopted for the 4NC/3BUR of inventory has gradually been updated in accordance with the 2006 IPCC Guidelines.

2.4 Methodology



$$E_{gas} = \sum_{i,j,k} AD_{i,j,k} \times EF_{gas,i,j,k}$$

road transportation, CH_4 from single cropping rice and N_2O emissions from agricultural soils, etc.

Reference approach：

from top to bottom, a cross-checking method for CO_2 of the sectoral approach

2.4 Methods used for the GHGI

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Source/Sink Categories	CO_2		CH_4		N_2O	
	Methodology	Emission Factors	Methodology	Emission Factors	Methodology	Emission Factors
Energy industries	T2	D, CS	T1, T2	D, CS	T1, T2	D, CS
Manufacturing industries and construction	T2	D, CS	T1	D	T1	D
Transport	T2	D, CS	T1, T3	D, CS, M	T1, T3	D, CS, M
Other sectors	T2	D, CS	T1	D	T1	D
Fugitive emissions from solid fuels			T1, T2, T3	D, CS		
Fugitive emissions from oil and natural gas			T1, T3	D, CS		
Mineral industry	T1, T2	D, CS				
Chemical industry	T1, T2	D, CS	NE	NE	T2	CS
Metal industry	T1, T2	D, CS	T1	D	NO	NO
Non-energy products from fuels and solvent use	T1	D				
Enteric fermentation			T1, T2	D, CS		
Manure management			T1, T2	D, CS	T1, T2	D, CS
Rice cultivation			T3	CS		D, CS
Agricultural soils					T1, T2	D, CS
Field burning of agricultural residues			T1	D	T1	D
Forest land	T2	CS	T1	D	T1	D
Cropland	T3	CS	IE	IE	IE	IE
Grassland	T2	CS	T1	D	T1	D
Wetlands	T2	CS	T2	CS	NE	NE
Settlements	T2	CS				
Other land	T2	CS				
Harvested wood products	T2	CS				
Solid waste			T1, T2	D, CS		
Biological treatment			T1, T2	D, CS	T1, T2	D, CS
Wastewater treatment			T1, T2	D, CS	T1, T2	D, CS
Incineration of waste	T2	CS	T1	D, CS	T1	D, CS

2.5 Data source of ADs and EFs

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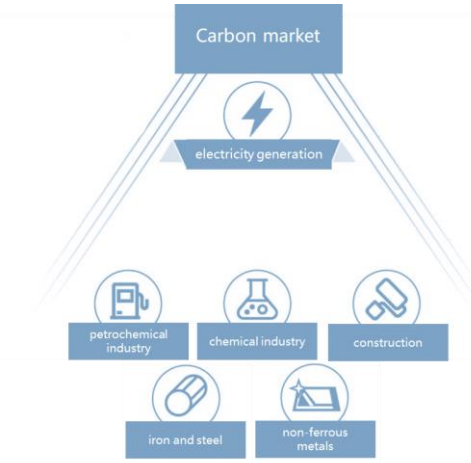
■ Activity data

- National Bureau of Statistics, Official Yearbook
- sector statistical reporting system for addressing climate change
- enterprise or facility level data
- literature investigation, extrapolation/interpolation, expert judge etc.

■ Emission factors

- National Bureau of Statistics，associations，facility level data (e.g. national carbon market)，special research, literature investigation, extrapolation, expert judge and IPCC guideline default values etc.



2.5 National GHG emission factor database

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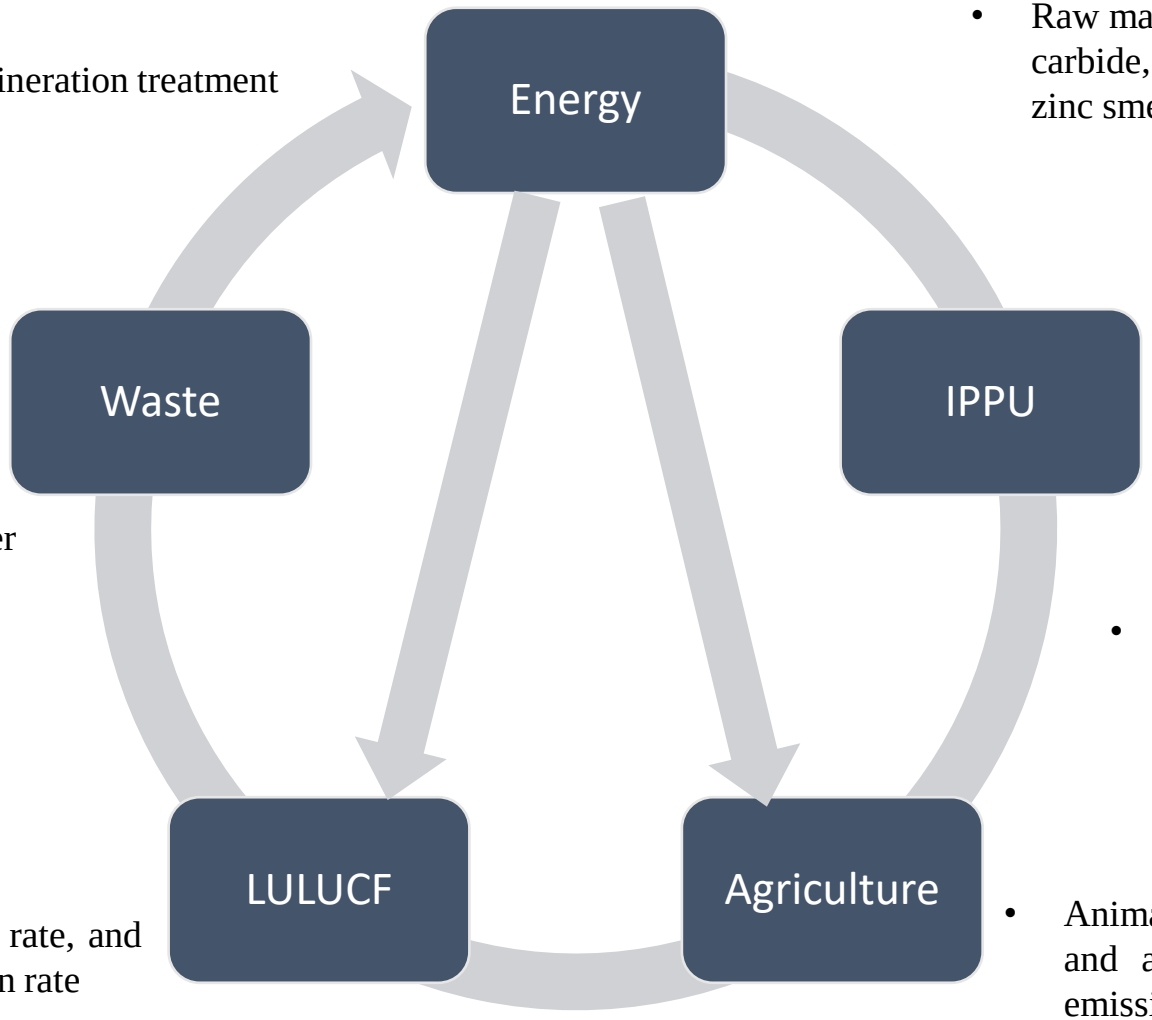
- Implementation Plan: Accelerating the Establishment of a Unified and Standardized Carbon Emission Statistical Accounting System, establish a national GHG emission factor database

2.6 Strengthen consistency in crosscutting sector

- Municipal solid waste incineration treatment

- Raw materials and non-energy use: calcium carbide, ethylene, methanol, ferroalloys, lead-zinc smelting



- Abandoned wood and paper

- Production of synthetic ammonia and application of urea

- Crop statistics, straw return rate, and field crop manure application rate

- Animal feeding quantity data, grazing animal data, and animal manure management nitrous oxide emissions

2.6 QA/QC and verification

verification of the consistency between the input data and original data of statistical data, parameters and emission factors used in various fields of the inventory

verification of the consistency between model parameters and other related modules

verification of the consistency of data from different inventory sector

2.6 QA/QC and verification

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Technical workshops

- Organize a number of technical workshops for academic exchanges and discussions with other domestic research institutions and experts to fully learn from their research results.

Independent experts

- Invite experts who were not involved in the preparation of the inventory to carry out independent analyses and assessments of the inventory's methodologies and results as a support to the quality assurance of the inventory.

External data cross-checking

- Facility-level data from China's national carbon market were used to cross-check GHG inventory

2.7 National Greenhouse Gas Inventory Database System

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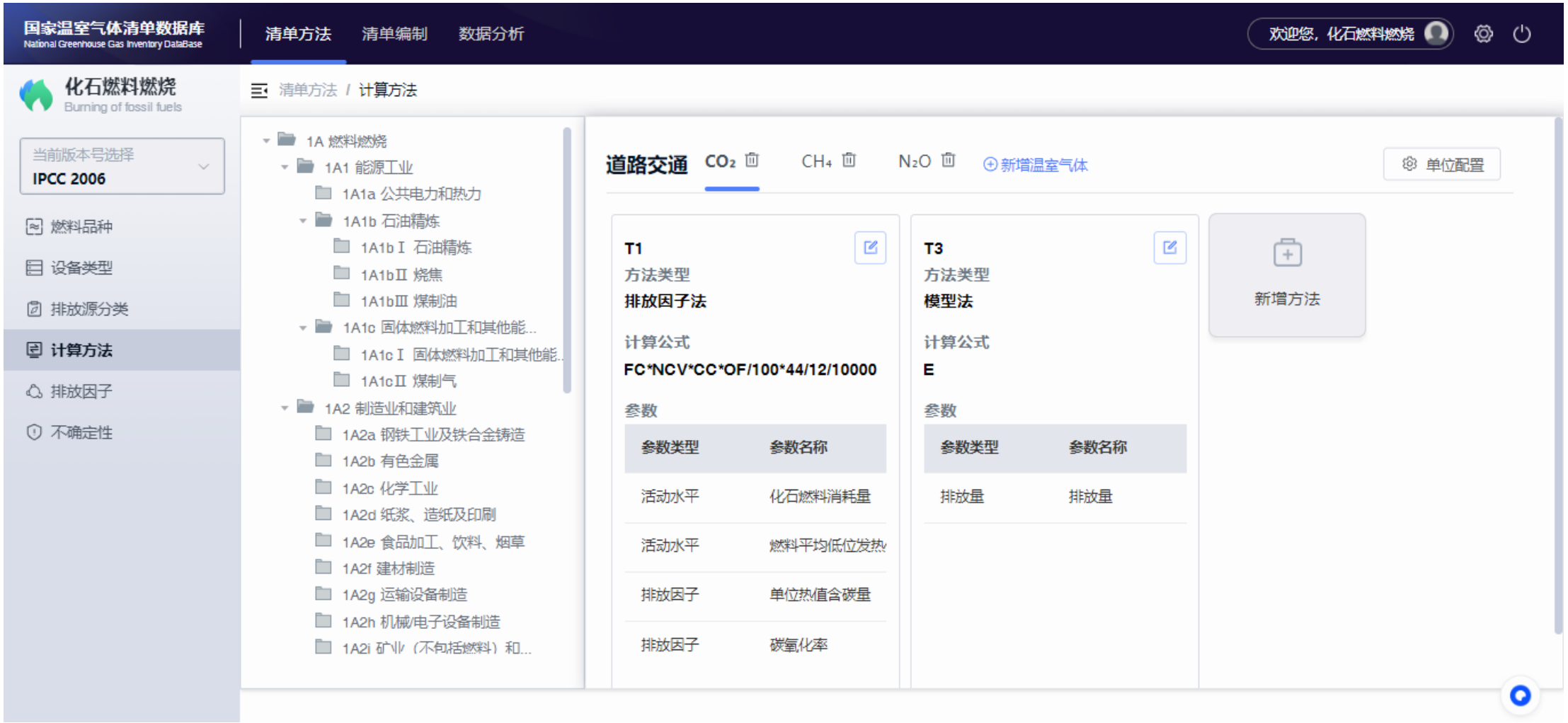
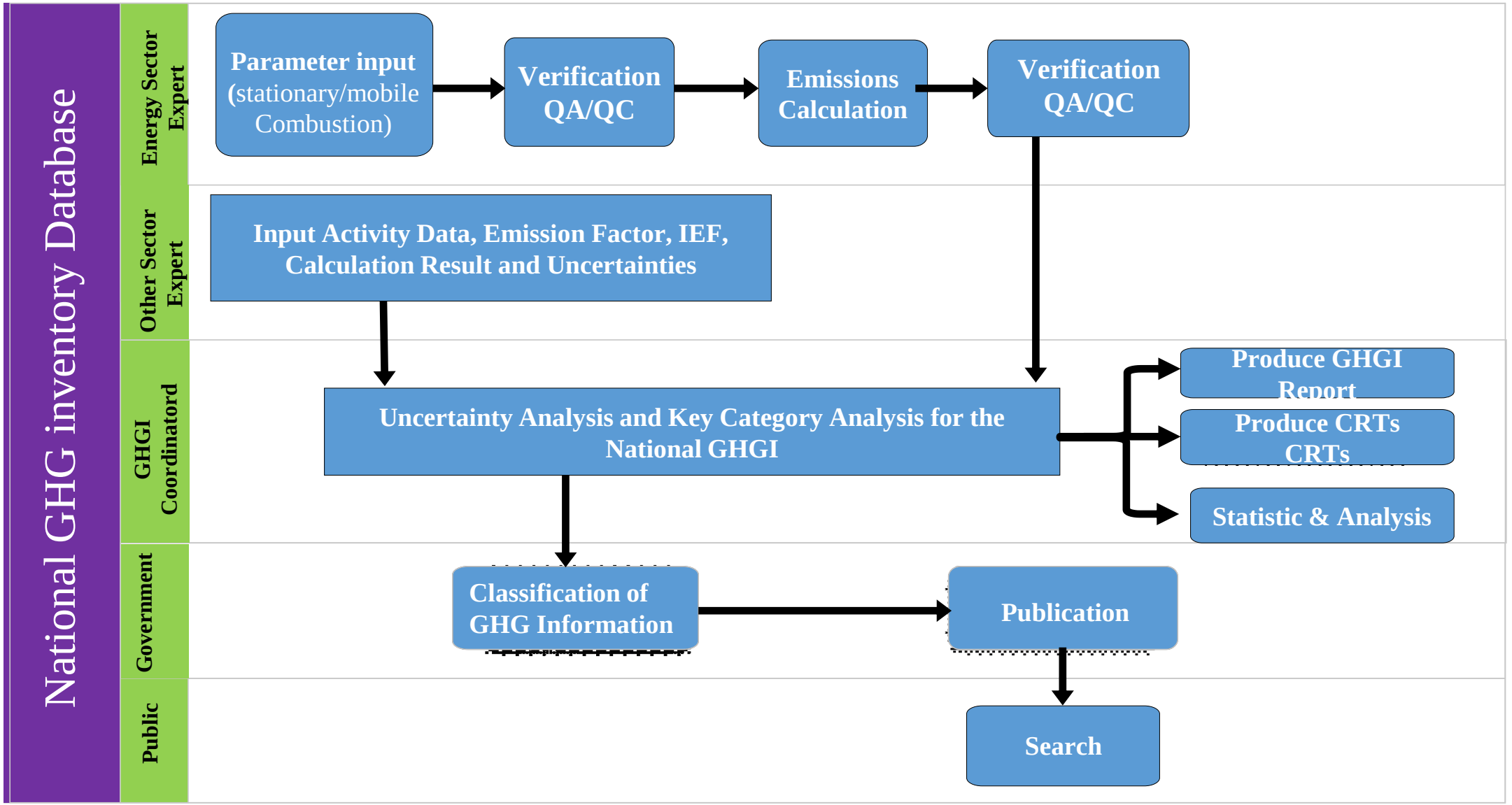


2.7 archiving and management



3.1 Identify capacity building needs and improvement

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Data collection	Reporting	Working mechanism
• Improve data collection and statistical mechanisms • strengthen the ability to measure and analyze country-specific GHG emission factors	• Strengthen understanding of transparency rules • Develop and improve National GHG inventory database	• normalization Mechanism of GHGI Compilation • QA/QC plan • Strengthen communication and enhance the capacity building in GHGI compilation

3.2 Strengthen cooperation and communication

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- Frontline Negotiations
- Get involved in the UNFCCC international review process
- Actively participate in international seminars
- Enhance capacity building

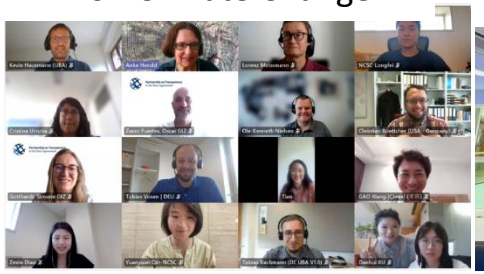
Review in Italy

Review in Sweden

Review in Romania

21st WGIA

T2D on Climate Change



Communicate with IEA

Course of greenhouse gas management and accounting	Training programme for technical expert reviewers	Technical review of national GHGI	Domestic capacity-building workshop

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Thanks for you attention!

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