

Setting up National Inventory System & Management of Inventories



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Outline

Goal (What has to be delivered?)

- ∅ National Inventory Report (NIR) & Informative Inventory Report (IIR)
- ∅ CRF-Tables & NFR-Tables

How to reach the goal ?

- n What is National Inventory System (NIS)
- n Inventory planning
- n Inventory preparation
- n Documentation and archiving Quality assurance & Quality Control, QA/QC
- ∅ Annex ; Accreditation, ISO 17020

Goal: elements of inventory

- ⌘ Workplan - Manual of Procedures (internal report), QA/QC plan, Improvement strategy
- ⌘ **Tables (NFR, CRF) of national emissions and removals, including trend tables if available**
- ⌘ **Worksheets (calculation sheets, models,..)**
- ⌘ **Projections**
- ⌘ **NIR/IIR (description of the methodology, sources of data and EFs, actual data, recalculations,..)**
- ⌘ **Background information (e.g. national energy balance, forestry statistics, results of measurements....)**
- ⌘ **Archiving system**

Why do we need NIS ?

- p Compliance with international conventions
e.g. UNFCCC (CP7/D17), CLRTAP
- p To improve the quality of:
 - n Inventories (consistency, comparability, completeness, transparency, accuracy)
 - n Projections
 - n 2NC
- p To increase efficiency of inventory making
- p To make the inventory preparation system sustainable

What do we understand under national inventory system

Legal , Institutional, and procedural arrangements necessary to prepare national (AE/GHG) inventories and projections

- ∅ Single national entity
- ∅ Planning (define responsibilities, choice of methods and data)
- ∅ Preparation (Use of good practice, inventory estimation, documentation)
- ∅ Quality assurance and quality control procedures
- ∅ Archive inventory information

Requirements are functional

- n Flexibility for national circumstances
- n Compliance depends on ability of system to produce reliable inventory

Legal framework

- ⌘ Legal bases for regular compilation and reporting on national inventories (*Act, decrees, memorandum of understanding...*)
- ⌘ **Setting-up responsibilities**
- ⌘ Ensures provision of required resources (on time)
- ⌘ Ensures inventory compilers access to data needed on time
- ⌘ Clearly defines responsibilities



Institutional framework in place

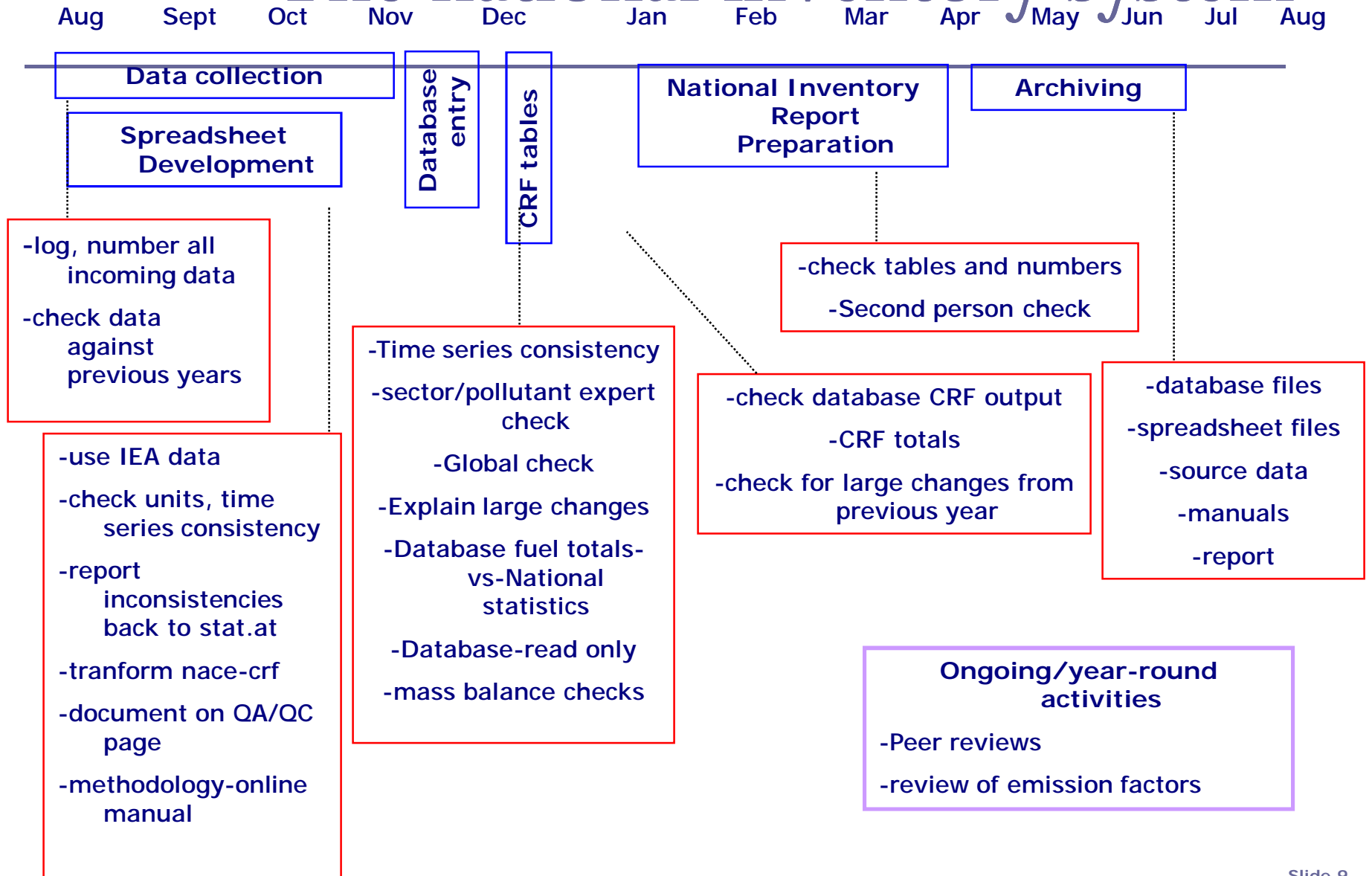
- ⌘ Inventory preparation process set-up
- ⌘ Overall responsibility – single entity to coordinate all activities
- ⌘ Delegated responsibilities for compilation of sectoral inventories
- ⌘ Activity data providers are identified
- ⌘ Quality manager nominated
- ⌘ Archiving system established
- ⌘ Rules for inventory preparation elaborated



Procedural framework

- ⌘ Annual workplan
- ⌘ Time schedule
- ⌘ Manual of methods, EF and AD
- ⌘ Formats for data exchange and reporting
- ⌘ QA/QC plan
- ⌘ Documentation system
- ⌘ (Long-short tem) Strategy for improvement

The national inventory system



Importance of Sustainable National Inventory System

- Ability to develop high quality inventory at regular intervals (e.g., annually, every 2-4 years, etc).
 - Resources are focused on the most significant emission sources in the country
 - Sources of data are identified, appropriately archived and regularly accessible
 - Emission estimates are continually improved; adhere to international guidance (e.g., IPCC Good Practice Guidance, EMEP Corinair Guidebook)
- A complete and accurate inventory is a foundation for analysis of a range of energy and environmental issues

Management of Inventories



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Main steps in inventory management

- p (Assessment of current status)
- p Inventory Planning (one cycle)
 - n general
 - n source specific
- p Inventory preparation (including QA/QC)
- p Presentation/reporting of results
- p Inventory Archiving
- p Inventory improvement strategies LT-ST (use key category analyses for prioritisation)

Inventory Preparation Process

Inventory compiling includes

- planning of how to distribute available resources (manpower, time,...),
- prioritization of planned improvements: focus on political or public awareness due to current environmental problems or emission reduction limits
... hard to meet...

Preparation of the inventory includes three stages.



Inventory planning

- team
- timetable
- data sources
- key source analysis
- ...

Inventory preparation

- collecting data
- emission estimation
- report writing
- QA/QC
- ...

Inventory management

- data processing
- data storage & backup
- access authorization
- ...

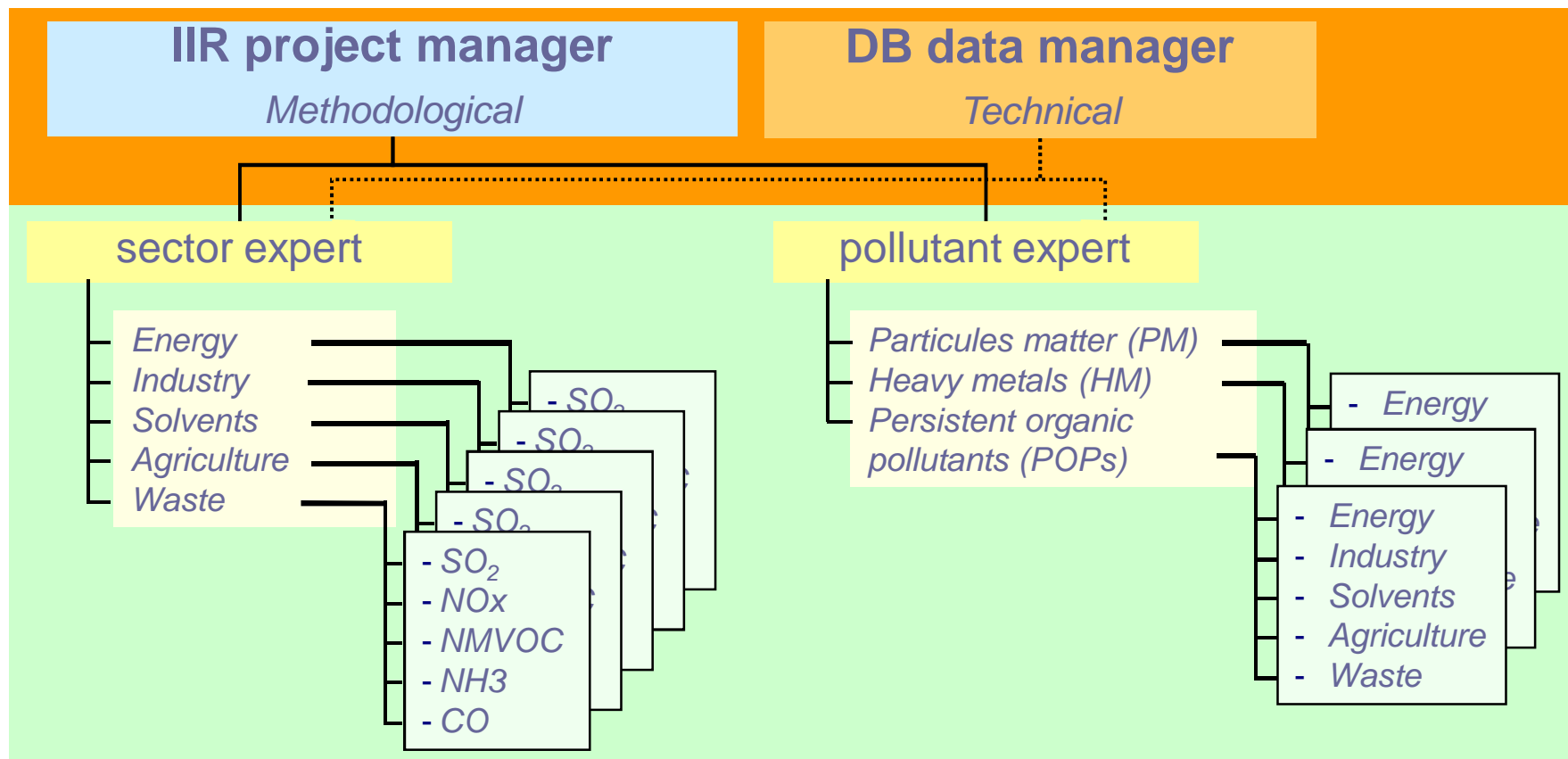
Inventory planning activities

- ⌘ Appoint national entity and inventory coordinator
- ⌘ Define inventory products, asses costs, elaborate overall schedule
- ⌘ Assign other inventory personal (sectoral experts, quality manager, DB manager...)
- ⌘ Establish rules (communication, responsibilities, legal bases, contracts,..)
- ⌘ Awareness activities (communication with stakeholders)

Inventory planning

- p Complete and distribute workplan, time schedule, manual, reporting instructions, supporting materials, QA/QC plan
- p Prepare budget
- p Draft/Update of manual (instructions for inventory maker)
 - n General (Archiving guidance)
 - n Source specific guidance
- p Consider strategy for improvements

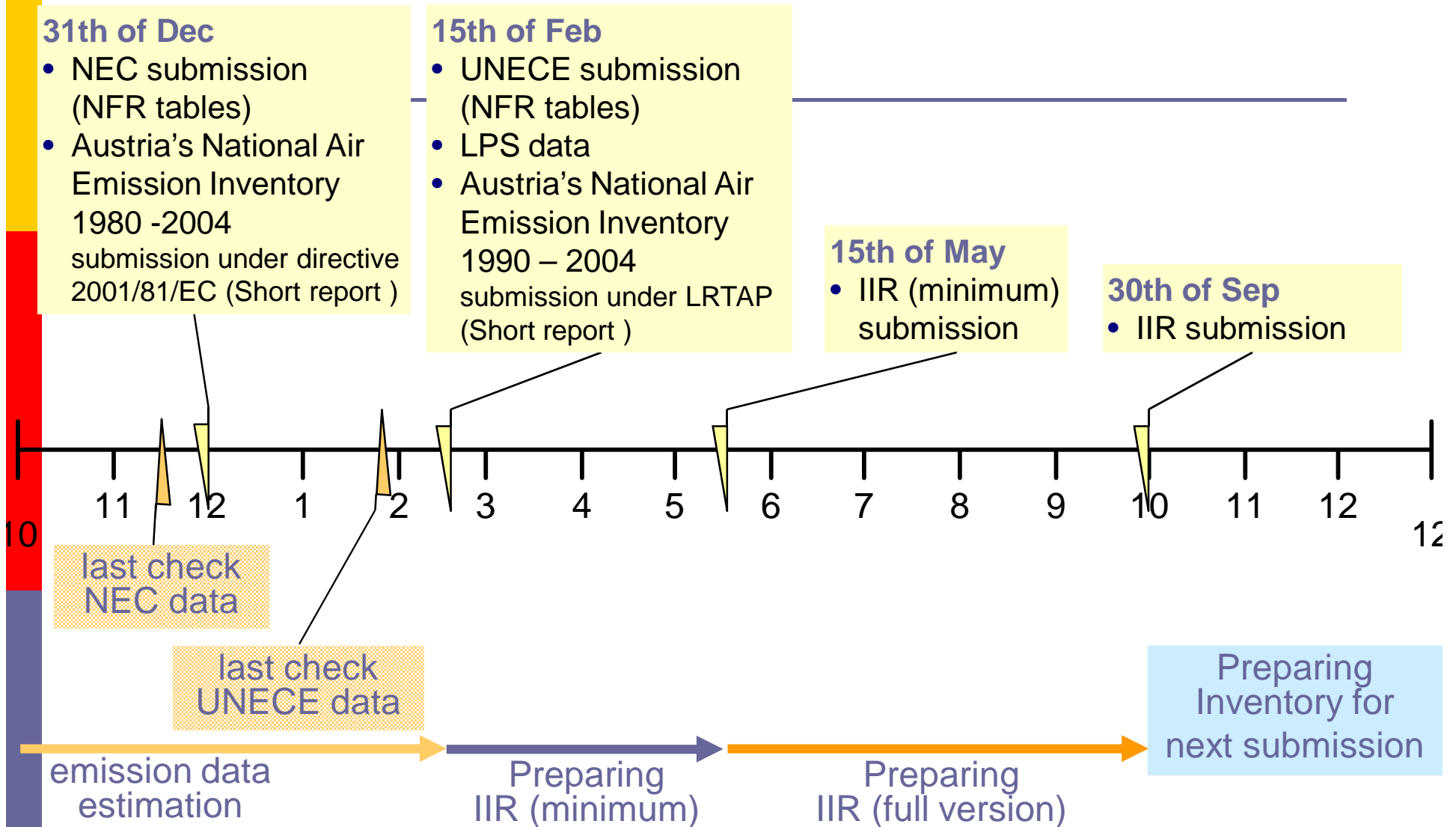
Inventory planning: set up team



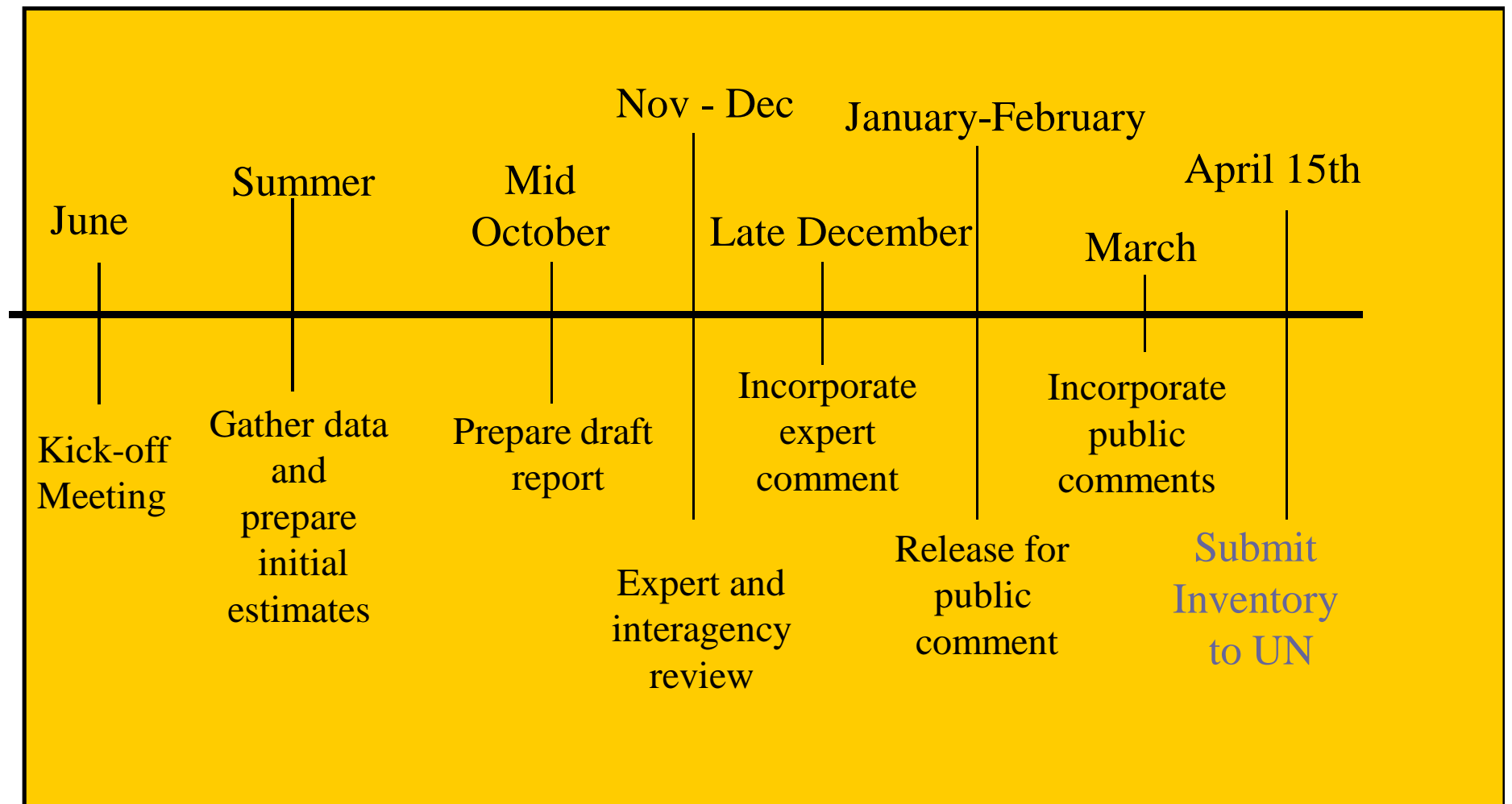
Responsibilities of sector experts / pollutant experts

- collecting activity data, emission factors and other relevant information
- report (chapter) writing
- providing background data for NFR tables
- QA/QC procedures

Inventory planning: set up timetable



Example: U.S. Inventory Cycle



Source specific tasks in planning phase

- p Assess status, determine priorities and assign staff responsibility
- p Identify gaps
- p Establish links with comparable activities in the country
- p Assess source related costs
- p Distribute source specific instructions
 - n Agree formats for inventory reporting
 - n Delegate responsibility for writing the spectral chapters in IIR resp. NIR
 - n ...

Steps in Inventory Preparation

- 1) Identify key sources
- 2) Identify and collect AD
- 3) Select methods and EFs (EMEP IPCC Guidelines, GPG Guidance, national)
- 4) Calculate emissions, document all steps
- 5) Assess uncertainties
- 6) Recalculate previous estimates if needed
- 7) Complete reporting tables
- 8) Draft inventory report
- 9) Apply QA/QC procedures
- 10) Archive all materials

Guidance and Guidebooks

- Ⓟ **EMEP/ Corinair Inventory Guidebook**
<http://reports.eea.europa.eu/EMEPCORINAIR5/en/page002.html>
- Ⓟ **EMEP Draft Revised Emission Reporting Guidelines**
ECE/EB.AIR/GE.1/2008/11
http://www.unece.org/env/lrtap/emep/emep32_docs.htm
- Ⓟ **IPCC Inventory Guidebooks and IPCC Good Practice Guidance**
<http://www.ipcc.ch/ipccreports/methodology-reports.htm>
- Ⓟ **UNFCCC reporting guidelines**





Steps Inventory Reporting

- ⌘ Assign focal point and define responsibilities
- ⌘ Define products to be completed
- ⌘ Coordinate deadlines
- ⌘ Set up rules for inventory approval
- ⌘ Perform QA/QC
- ⌘ Establish rules for update (recalculation) of official emission results
- ⌘ Establish system for archiving

QA/QC, documentation and archiving



start-up QA/QC procedures

- ⦿ validation of methods (choice, applicability)
- ⦿ data management
- ⦿ setting up: documentation, reporting, archiving
- ⦿ organisational arrangements
 - personnel (recruitment, CPD)
 - defined responsibilities
 - management review, audits

Definition of QA/QC procedures

- p** **Quality Control is a system of routine technical activities, to measure and control the quality of the inventory as it is being developed. The QC system should :**
 - n** Provide routine and consistent checks to ensure data integrity , correctness and completeness
 - n** Identify and address errors and omissions
 - n** Document and archive inventory material and also record all QC activities
- p** **Quality assurance is includes a planed system of review procedures conducted by personnel not directly involved in inventory compilation/ development process. Reviews :**
 - n** verify that data quality objectives were met
 - n** ensure that inventory represents the best possible estimates of emissions and removals

General QC procedures (Tier 1)

- ⌘ Focus on processing, handling, documenting, archiving and reporting procedure that are common to all inventory source categories
- ⌘ List of routines to be performed by Inventory agency during (annual) preparation of inventory (crosschecks, visual control,....)
- ⌘ Set up priorities

Source specific QC procedures (Tier 2)

- ⌘ Performed during the whole inventory process by inventory agency
- ⌘ Require source specific knowledge
- ⌘ List of routines to be performed for specific source category
 - n Emission data QC
 - n Activity data QC
 - n (QC of uncertainty estimates)

QA procedures (unbiased review)

- ⌘ Objective review to assess the quality of inventory, and identify areas for improvement. Review per sector:

 - n activity data and appropriateness of emission factors, methods
 - n calculations
 - n documentation
- ⌘ [Good practise is if inventory agency conducts peer review prior inventory submission]

Documentation and archiving differences & „definitions“

p Documentation (References)

- n descriptions of sources of the used data and methods and „background“ leading to conclusions in a way that third person can find them
- n the way how to persuade a reader or reviewer of a report that my data and conclusion are correct

p Archiving

- n Storage of all relevant documents and materials used in inventory preparation
- n to enable a follower to check all my steps and learn from my achievements and failures
- n to enable any recalculations

Documentation and archiving – differences and connecting points

- p Documentation and archiving are **closely connected**
- p Inventory documented without any archive can be assumed trustworthy
- p Inventory not documented is not trustworthy, provision of ex-post documentation from archived material requires effort comparable to elaboration of inventory itself
- p Documentation and archiving: a **balance between extent and accessibility**

Archiving systems

p simple and cheap:

- n paper folders with a **content at beginning**,
- n CD (DVD) with a „standard“ file system
- n CD starting with contents and hypertext connections (like CD GPG)
- n Mixed system (partly paper, partly CD) can be dangerous (document may exist in both or in none)

p sophisticated and expensive:

- n simpler tools programmable by common user e.g. Lotus Notes (?)
- n proprietary programmed databases in different environments (MS SQL, Oracle, Informix, Sybase, SAP)
- n all documents scanned (or in e.g. REF format)

Discussion items

- p **How to ensure /improve sustainability of NIS**
- p **How to improve quality of national inventories**

- p **Where are the problems ?**
 - n AD : accessibility, availability, completeness, confidentiality,
 - n EFs : applicability, uncertainty,....
 - n Tools: guidance, software, literature, database,..
 - n Legal barriers,...
 - n awareness of decision maker, data providers...
- p **What can we do?**



Thank you



Annex ISO

Quality : accreditation (1)

ISO 17020

Title: "General Criteria for the operation of various types of bodies performing inspection"

in addition to ISO 9001 relevant requirements are:

- ∅ evaluation of technical competence
- ∅ independence, impartiality and integrity
- ∅ confidentiality, co-operation

ISO 9001 is specific to quality management systems

relevant requirements of the EN/ISO 9000 series of standards applying to the quality systems for inspection bodies are incorporated in ISO 17020

Inspection

Examination of a product design, product, service, process or plant and determination of their conformity with specific requirements or, on the basis of professional judgement, general requirements (ISO 17020)

Quality : accreditation (2)

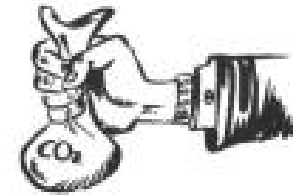
elements of ISO 17020

- ∅ Administrative requirements (organisation legally identifiable)
- ∅ **Independence, impartiality and integrity**
- ∅ Organisation and management (clearly defined responsibilities, training of staff)
- ∅ Quality system (**QC/QA procedures, reporting, documentation, achieving**, internal and external audits, **improvement plan**, management review)
- ∅ Personnel (recruitment, CPD)
- ∅ **Methods** (choice, applicability)
- ∅ **Records** (backup)
- ∅ Confidentiality, Facilities and equipment, Reports, Sub-contracting, Complaints, Co-operation

Quality : accreditation (3)

Definitions: **accreditation**/certification

Independence, impartiality and integrity



The personnel of the inspection body shall be free from any commercial, financial and other pressures which might affect their judgement.

Procedures shall be implemented to ensure that persons or organisations external to the inspection body cannot influence the results of inspections carried out



Quality : accreditation (4) human resources needed

Implementation: 2,5 person-years

**Maintenance: approx. 10-15% in addition to
inventory work**

Definitions: accreditation/certification

accreditation	certification
by (government appointed) accreditation body	by (accredited) certification body
ISO 17020	ISO 9001
3 rd party attestation competence to carry out specific conformity assessment tasks relevant ISO 9001 requirements are included in 17020	3 rd party attestation quality managements system in conformity with ISO 9001

Definitions: accreditation/certification

accreditation

evaluation of technical competence (\neq ISO 9001)

“Accreditation is a 3rd party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks” (ISO IEC 17011)

3rd party periodic review that inspection body still complies with all requirements as stipulated by ISO 17020