



# **MRV System and Responsibilities of Local Climate Authorities in MRV**

# Contents

**I. Definition of MRV**

**II. Development of MRV in EU**

**III. Application of MRV in China**

**IV. Development Prospect of MRV**

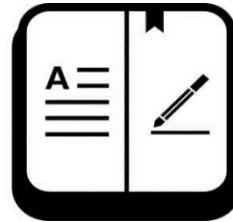
**V. Responsibilities of Local Authorities in MRV**

# Definition of MRV

**MRV is a system that can monitor, report, and verify greenhouse gas emission.**



**Monitoring**



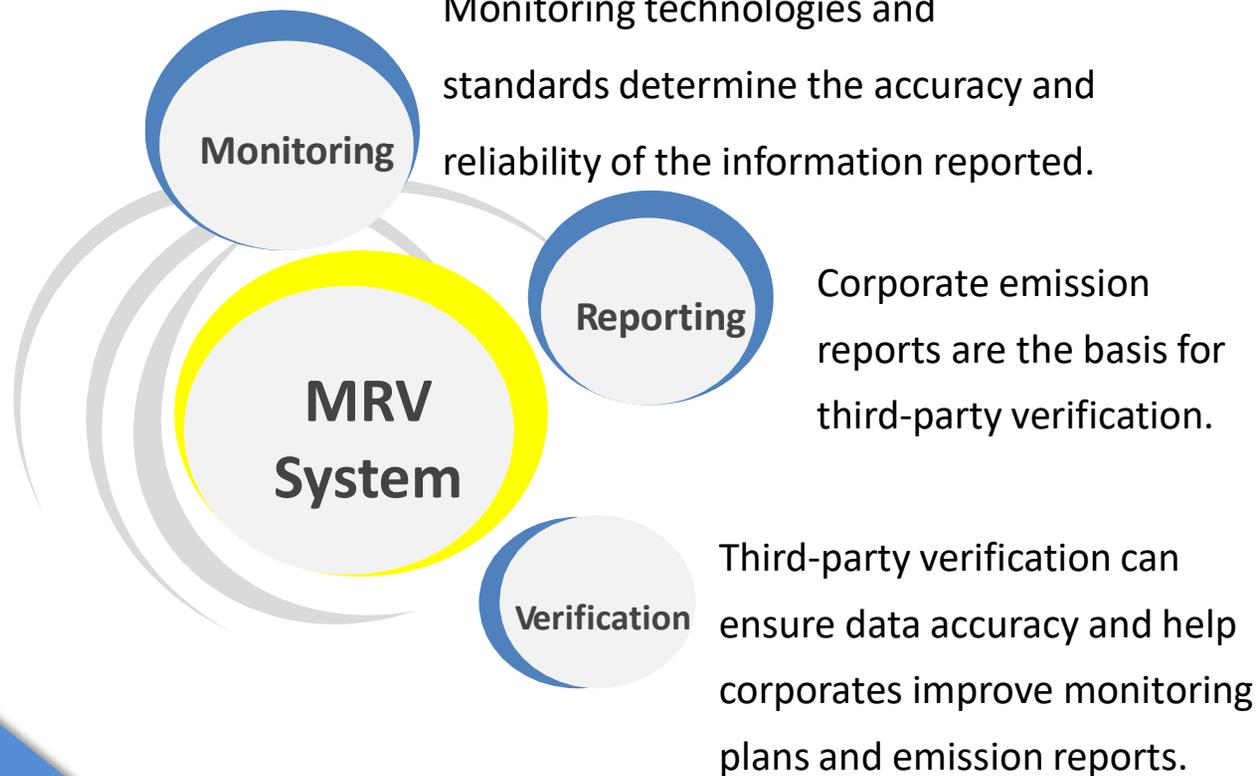
**Reporting**



**Verification**

- Monitoring (M) means the determination for the boundaries, types, and levels of the measured emission.
- Reporting (R) means the emission accounting and the result output.
- Verification (V) means inspecting, obtaining evidence of, and confirming the steps of monitoring and reporting.

# Relations of Monitoring, Reporting, and Verification



A sound MRV system serves as an important foundation and guarantee for accurate, comparable, and reliable carbon emission data, as well as a significant basis for the carbon market operation.

# Terms and Definitions

## Emission Source

It means a physical unit or process that releases greenhouse gas into the atmosphere.

## Activity Data

It is related to the amount of fuel or materials consumed or produced, and it is expressed in joule for energy, ton for solid and liquid mass, and normal cubic meter for gas.

## Direct Emission

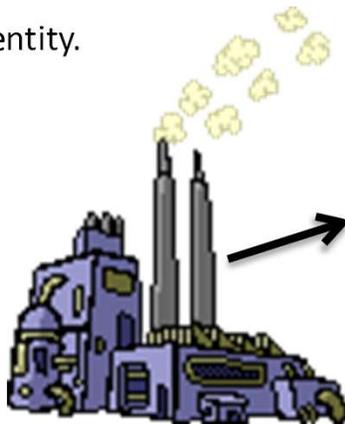
It means the greenhouse gas emission generated by an emission source owned or controlled by the emission entity.

## Emission Factor

It means the greenhouse gas emission per unit of activity data.

## Indirect Emission

It means the emission caused by the activities of an emission entity but occurring at the emission source owned or controlled by another emission entity.



# MRV Accounting Methods

➔ The accounting methods are divided into two categories.

Calculation  
-based  
methods

**Standard method:** greenhouse gas emission = activity data \* emission factor

**Mass balance method:** greenhouse gas emission = (mass of carbon entering the accounting boundary – mass of carbon leaving the accounting boundary) \* 44/12

Measurement  
-based  
method

Greenhouse gas emission = volume of flue gas \* concentration of CO<sub>2</sub> in flue gas/greenhouse gas

Measurement-based method basically adopts CEMS

# Contents

**I. Definition of MRV**

**II. Development of MRV in EU**

**III. Application of MRV in China**

**IV. Development Prospect of MRV**

**V. Responsibilities of Local Authorities in MRV**

# EU's MRV System

## Development History

On January 29, 2014, the European Commission (EC) passed Resolution No. **2004/156/EC** and issued the **MRG2004** *Guide to the Monitoring and Reporting of Greenhouse Gas Emission*.

### Phase I

In 2007, the EC passed Resolution No. **2007/589/EC** (**MRG2007**) and issued a new guide to the monitoring and reporting of greenhouse gas emission.

### Phase II

On June 21, 2012, the EC promulgated **Regulation No. EU 601/2012 (MRG 2012)** and issued the regulation to the monitoring and reporting of greenhouse gas emission.

### Phase III

In June 2012, the EC issued **Regulation No. EU 600/2012** which clarified the content and procedure of verification.

# EU's MRV System

## Monitoring and Reporting System

The EU's monitoring and reporting system has transformed from the guides in the first and second phases to the regulation in the third phase. The major changes are as follows:

- In terms of the scope of monitoring, **the number of greenhouse gas types monitored is gradually increasing.** In the first and second phases, only CO<sub>2</sub> emission was monitored, while in the third phase, the emissions of N<sub>2</sub>O and PFCs are monitored additionally.
- In terms of the monitoring procedure, **the role of the monitoring plan becomes more important and more prominent,** and the monitoring plan serves as the main basis for corporate accounting, reporting, and third-party verification.
- In terms of the monitoring methodology, the calculation-based methodology and measurement-based methodology in the third phase are described in more detail, **and the requirements for data acquisition and level become clearer.**

## Verification System

**In the first and second phases, the EU had no special verification system.** In June 2012, the EC issued Regulation No. EU 600/2012, that is, the regulation on the verification of greenhouse gas emission reports and ton-kilometer reports and the accreditation of verifiers, which applies to the third phase.

# EU's MRV System

## Monitoring and Reporting Scope

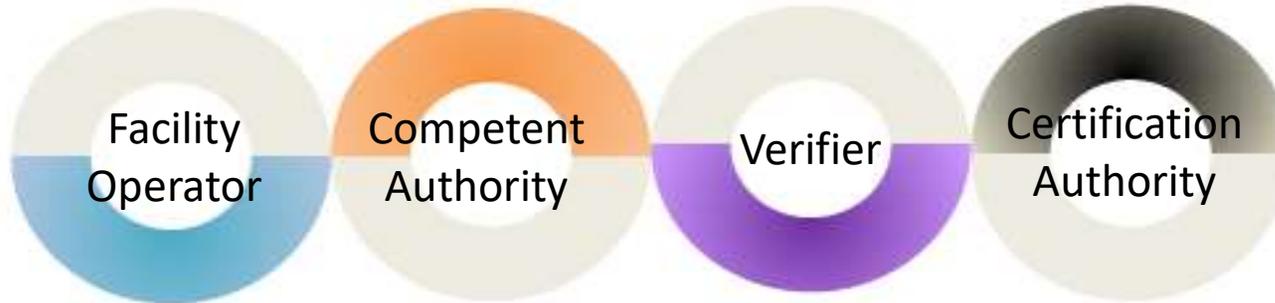
- **Types of greenhouse gas monitored by EU ETS:** six major types of greenhouse gas (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>) specified in the *Kyoto Protocol*
- **Emission sources covered:** EU's 27 member states, more than 11,000 facilities in Croatia, Iceland, Liechtenstein, and Norway, and 45% of the direct greenhouse gas emission (fuel combustion emission and industrial process emission)

## Accounting Methods

- **Calculation methods** (activity level method, mass balance method)
- **Measurement methods** (sampling method, continuous monitoring method)

# EU's MRV System

## EUETS Operating Mechanism



Responsible for preparing monitoring plan, carrying out real-time monitoring, making annual emission report, and submitting verified emission report and quota

Responsible for reviewing and approving the monitoring plan, checking real-time monitoring, verifying the emission report copy and site

Responsible for checking emission report

Responsible for certifying the verifier's qualification and supervising the verification of the verifier

## EU's MRV System

### MRV Operation Procedure



The operation procedure of EUETS's MRV system includes three parts: **submitting monitoring plan, submitting annual emission report, and verifying annual report.**

- Monitoring plan: detailed, complete, and transparent description of device monitoring methods
- Annual emission report: subject to verification by an independent third-party verification agency
- Certification by the verification agency: conforming to the verification rules by international standards such as ISO17011 and meeting the peer assessment of the European Certification Committee

# Contents

I. Definition of MRV

II. Development of MRV in EU

III. Application of MRV in China

IV. Development Prospect of MRV

V. Responsibilities of Local Authorities in MRV

# Specification on the Greenhouse Gas Emission Verification and Reporting for National Key Industry Enterprises

So far, the authorities have issued **three batches** of guides to the accounting and reporting of greenhouse gas emissions that cover **24 industries**.



## Ten industries of the first batch

- Cement
- Ceramics
- Plate glass
- Electrolytic aluminum
- Chemical industry
- Magnesium smelting
- Power generation
- Iron and steel
- Civil aviation
- Power grid



## Four industries of the second batch

- Coal production
- Petroleum and gas production
- Petrochemical industry
- Independent coking



## Ten industries of the third batch

- Mechanical equipment manufacturing
- Electronic equipment manufacturing
- Food/beverage/tobacco/tea
- Pulp/paper making
- Public building
- Land transportation
- Mining
- Other non-ferrous metal smelting
- Fluorine chemical industry
- Other industries

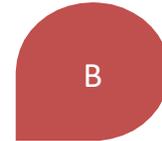
# Specification on the Greenhouse Gas Emission Verification and Reporting for National Key Industry Enterprises

The characteristics of greenhouse gas emission verification in key industries are as follows:

Using the lowest level corporate entity as the verification unit



Involving six types of greenhouse gas (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>)



Covering all emissions (direct and indirect emissions) related to production and business activities



The verification method should be simple, practical, and easy to conduct



# Specification on the Greenhouse Gas Emission Verification and Reporting for National Key Industry Enterprises

## + Inclusion Standards

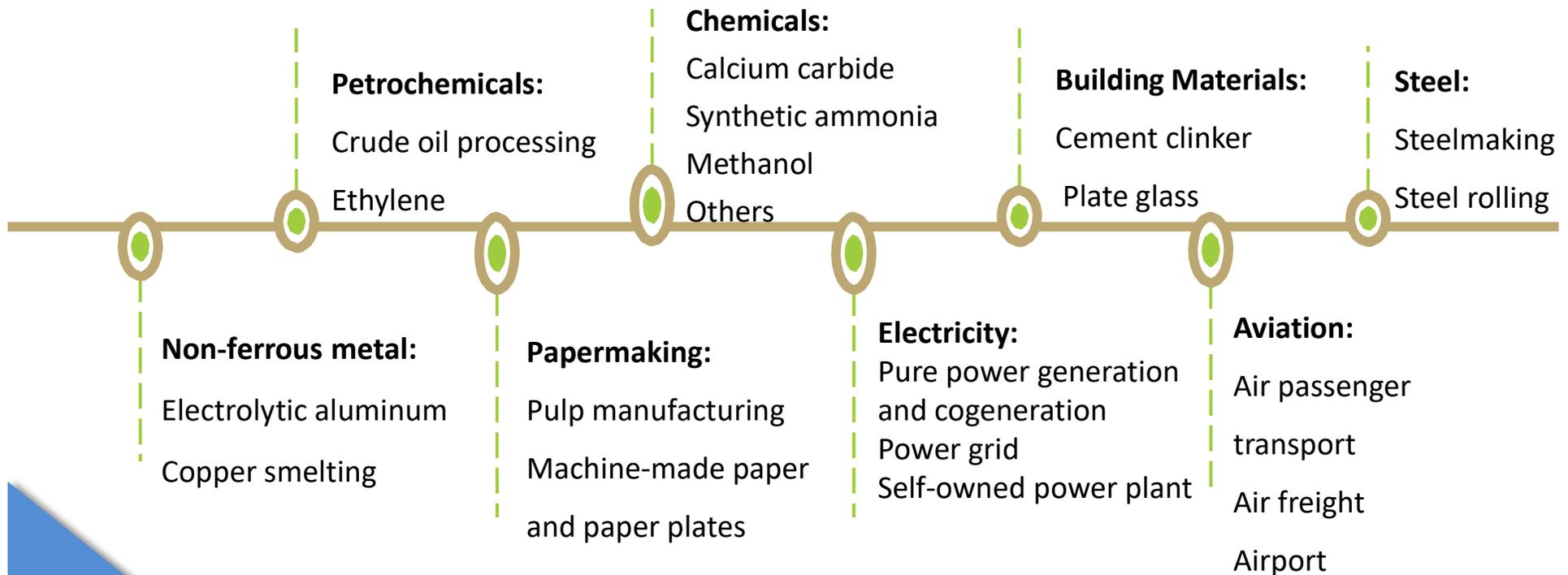
- The first phase of the national carbon emission trading market will cover the key industries such as petrochemicals, chemicals, building materials, steel, nonferrous metals, papermaking, electricity, and aviation. The participating entities are initially those **corporate entities and independent verification enterprises** whose businesses involve the above-mentioned key industries **while the annual comprehensive energy consumption of any year from 2013 to 2018 reached at least 10,000 tons of standard coal (26,000 tCO<sub>2</sub>).**
- **The self-owned power plants** whose annual installed power generation capacity of any year from 2013 to 2018 reached at least 6,000 kW.

## + Reporting Requirements

- Enterprises involved should verify and report their greenhouse gas emission and other related data annually. Besides, according to the quota allocation needs and the supplementary data template, the enterprises must calculate and report other relevant basic data not mentioned in the above guide.

# Specification on the Greenhouse Gas Emission Verification and Reporting for National Key Industry Enterprises

## Supplementary Data Sheet for Carbon Emission Verification of Eight Major Industries





# Specification on the Greenhouse Gas Emission Verification and Reporting for National Key Industry Enterprises

## Differences between Industry Accounting and Reporting Guide and Supplementary Data Sheet

### Guide to the Accounting and Reporting

VS

### Supplementary Data Sheet

#### Design Purpose

Supporting the national greenhouse gas emission reporting system

Supporting the national carbon trading system and meeting the requirements of quota allocation method

#### Application Scope

**The key emission enterprises of the eight major industries** with the annual energy consumption of any year from 2013 to 2018 reaching at least 10,000 tons of standard coal;

**The self-owned power plants of other enterprises** with the power generation capacity of any year from 2013 to 2018 reaching at least 6,000 kW

#### Reporting Boundary

Corporate entity

Corporate entity or production procedure

#### Data Type

Enterprise emission data

Enterprise emission data, production data, and quota-related data

#### Gas Type

Six types of greenhouse gas

Carbon dioxide

# Similarities and Differences between Global and China's Carbon Emission MRV Systems

## Similarities:

- (1) Relevant laws and regulations have been formulated for emission accounting, reporting, and verification.
- (2) Relevant accounting and verification standards (technical specifications) have been established (or are being established) for carbon emission accounting, reporting, and verification.
- (3) Six major types of greenhouse gas are monitored.

# Similarities and Differences between Global and China's Carbon Emission MRV Systems

	China	Global
<b>Legal Basis</b>	China's effective laws and regulations lag behind the world, and there is not any relevant law or regulation formulated by the National People's Congress.	Both the US and the EU have enacted higher-level special legislation—the US adopts federal legislation while the EU makes regional legislation.
<b>Accounting Method</b>	The accounting method combines the energy consumption calculation method and the emission coefficient calculation method to calculate the greenhouse gas emission.	One is direct emissions monitoring; The other is to calculate greenhouse gas emission based on the amount of fuel produced, the carbon content of the fuel, and other relevant data.
<b>Verification Method</b>	China is unable to carry out online monitoring and electronic verification due to the weak basis of measurement data. Presently, the on-site verification is basically undertaken by the third-party verification agencies according to relevant verification guides.	Verification in the US includes second-party and third-party verification. The third-party verification follows the verification procedure of the third-party verification agency and serves carbon trading. The second-party verification serves the reporting system and combines comprehensive electronic verification with appropriate on-site verification.

# Analysis of China's MRV System Issues

## Guide Consistency

- Different industry guides have different terms and definitions, confusing the emission enterprises and verification agencies to some extent.
- The default values of lower heating value, carbon content per heating value, and carbon oxidation rate of the same fuel vary with each industry guide.

## Measured Value Selection

- In practice, some enterprises found that the default values given in the guide are lower than the measured values. To reduce their emission, the enterprises did not adopt the available measured values.
- The practice is inconsistent with the state's goal to encourage enterprises to adopt the measured values.

# Analysis of China's MRV System Issues

## Supplementary Data Sheet

The supplementary data sheet lacks the descriptions of specific situations, such as the identification of the accounting boundary, the differences between the net purchased electricity and heating power and the consumption of electricity and heating power, and the calculation of emission factors.

## Lack of Specific Regulation on the Monitoring Plan

There is no detailed description of the monitoring plan in the guide, so the enterprises do not have a good understanding of the contents in the monitoring plan and the verification agencies cannot carry out the verification according to the monitoring plan.

# Contents

I. Definition of MRV

II. Development of MRV in EU

III. Application of MRV in China

**IV. Development Prospect of MRV**

V. Responsibilities of Local Authorities in MRV

## Development Prospect of MRV

To solve the problems of some guides, such as the inconsistent terms and definitions, and the inconsistent default value data of related parameters like lower calorific value and carbon content per calorific value of the same fuel, the Standardization Admission approved and issued the first batch national standards on November 19, 2015. The 11 standards include the *General Guideline of the Greenhouse Gas Emissions Accounting and reporting For Industrial Enterprises* and standards for greenhouse gas emission management in 10 key industries such as power generation, iron and steel, and civil aviation. The new standards have effectively solved the inconsistency issues of the accounting guides.

In the future, the accounting guides of other key industries will refer to the existing standards and be converted into national standards, which will gradually promote the standardization and institutionalization of carbon emission management.

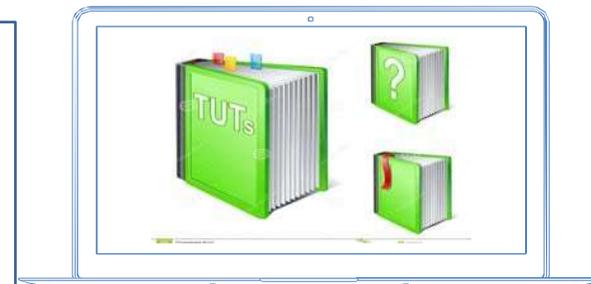


Improving the Consistency  
of Accounting Guide

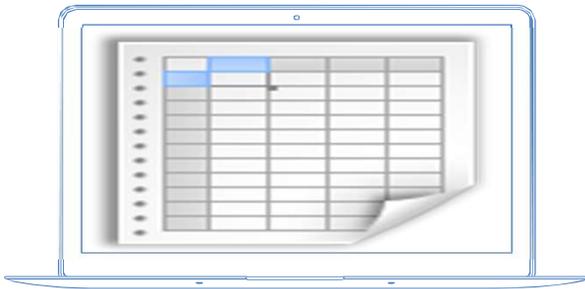
## Development Prospect of MRV

### Gradually Increasing the Default Values of the Parameters Related to the Guide to Encourage Actual Measurement

Currently, the default values of the parameters given by some industry guides are lower than the measured values, causing the enterprises' lack of motivation to adopt the measured values. Future guide makers should carry out more in-depth research and **improve the default values of relevant parameters to encourage enterprises to make actual measurements**. In this way, the calculation of enterprise greenhouse gas emission will more accurate, and it will become fairer for enterprises involved in carbon trading.



## Development Prospect of MRV



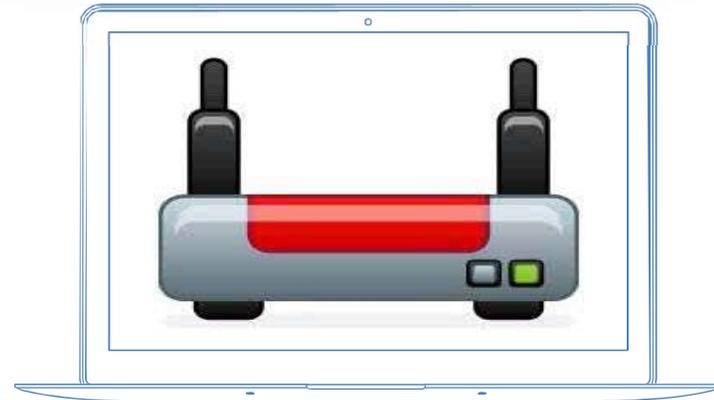
Adding Detailed Explanations  
and Accounting and  
Verification Requirements for  
Supplementary Data Sheet

- The descriptions of the supplementary data sheet are not detailed enough, and the emission enterprises and verification agencies do not have a consistent understanding of the content of the supplementary data sheet, so that they cannot report or verify relevant data according to the requirements of the compilers.
- The supplementary data sheet fails to support the quota allocation well.
- In the future, the MRV system needs to add detailed descriptions of the content of the supplementary data sheet and specify the accounting and verification requirements.
- The supplementary data sheet needs to be updated to meet the data requirements of quota allocation.

# Development Prospect of MRV

## Specifying the Content of the Monitoring Plan

In the future, the MRV system should specify the content of the monitoring plan, such as corporate profile, accounting boundaries, emission sources classification, accounting methods, data acquisition, quality assurance, and quality control. Besides, the requirements for the formulation and verification of the monitoring plan should be made to make the enterprise monitoring and reporting, as well as the agency verification, more standardized.



# Development Prospect of MRV

## Specialization of Third-party Verification Agencies

The state has made stricter regulations on the qualification verification of verification agencies and more refined provisions on verification responsibility confirmation. Therefore, both the professionalism of verification personnel and the quality of verification reports will improve gradually.



# Contents

I. Definition of MRV

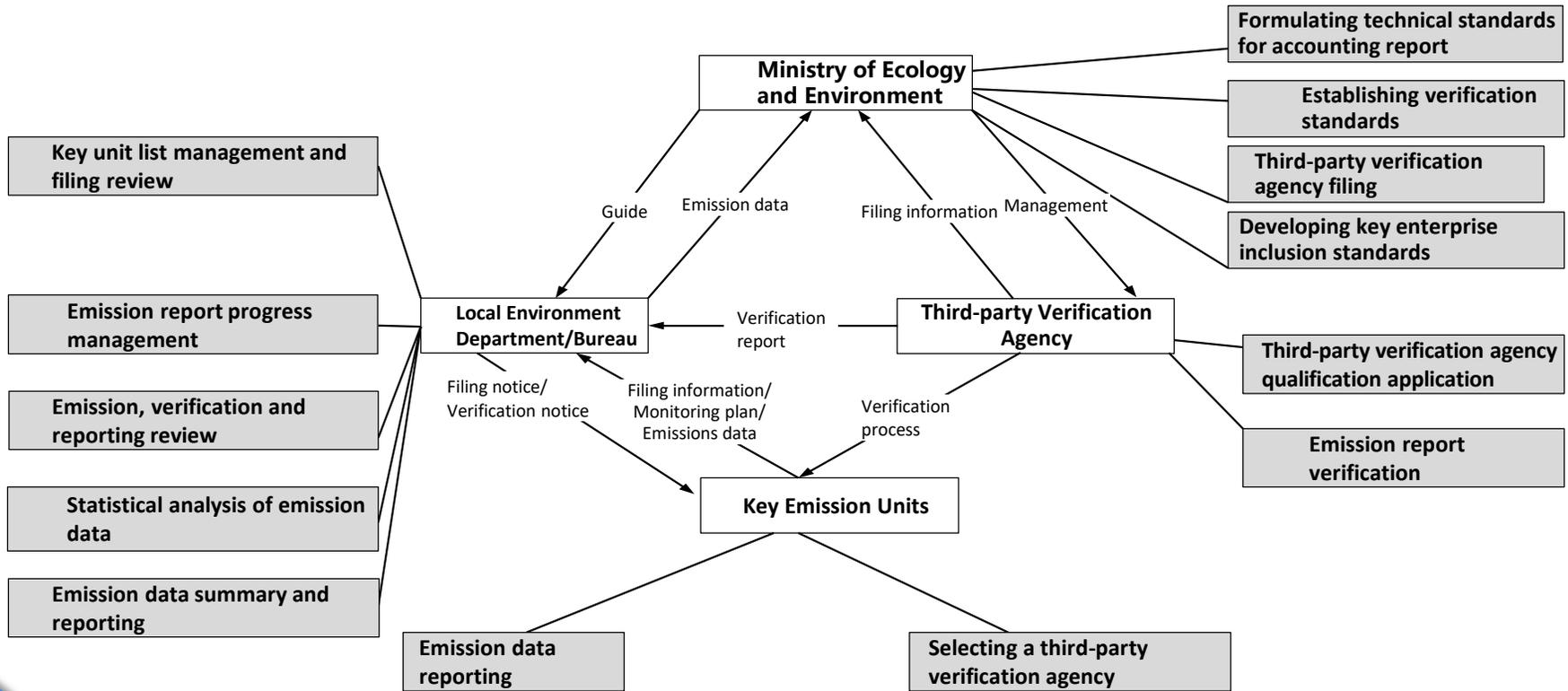
II. Development of MRV in EU

III. Application of MRV in China

IV. Development Prospect of MRV

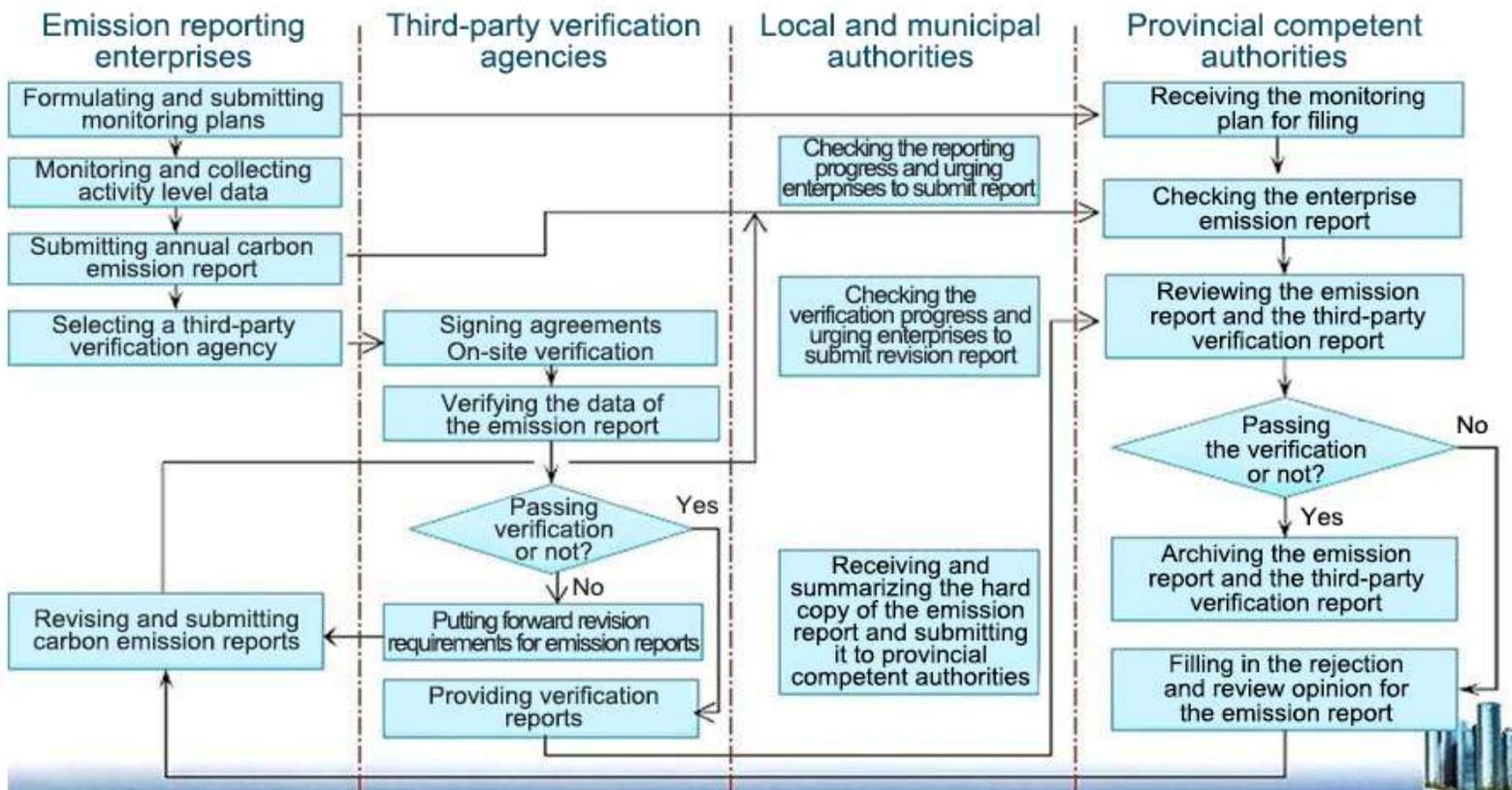
**V. Responsibilities of Local Authorities in MRV**

# Major Participants of the MRV System



# MRV Procedure

## Reporting and review procedure



# THANKS

Looking forward to your comments

**Linlin Dong**  
**SinoCarbon Innovation & Investment Co., Ltd.**  
**13699212676**  
**[donglinlin@sino-carbon.cn](mailto:donglinlin@sino-carbon.cn)**



**SINOCARBON**