Standards for CCS and energy conservation management (EnMS)

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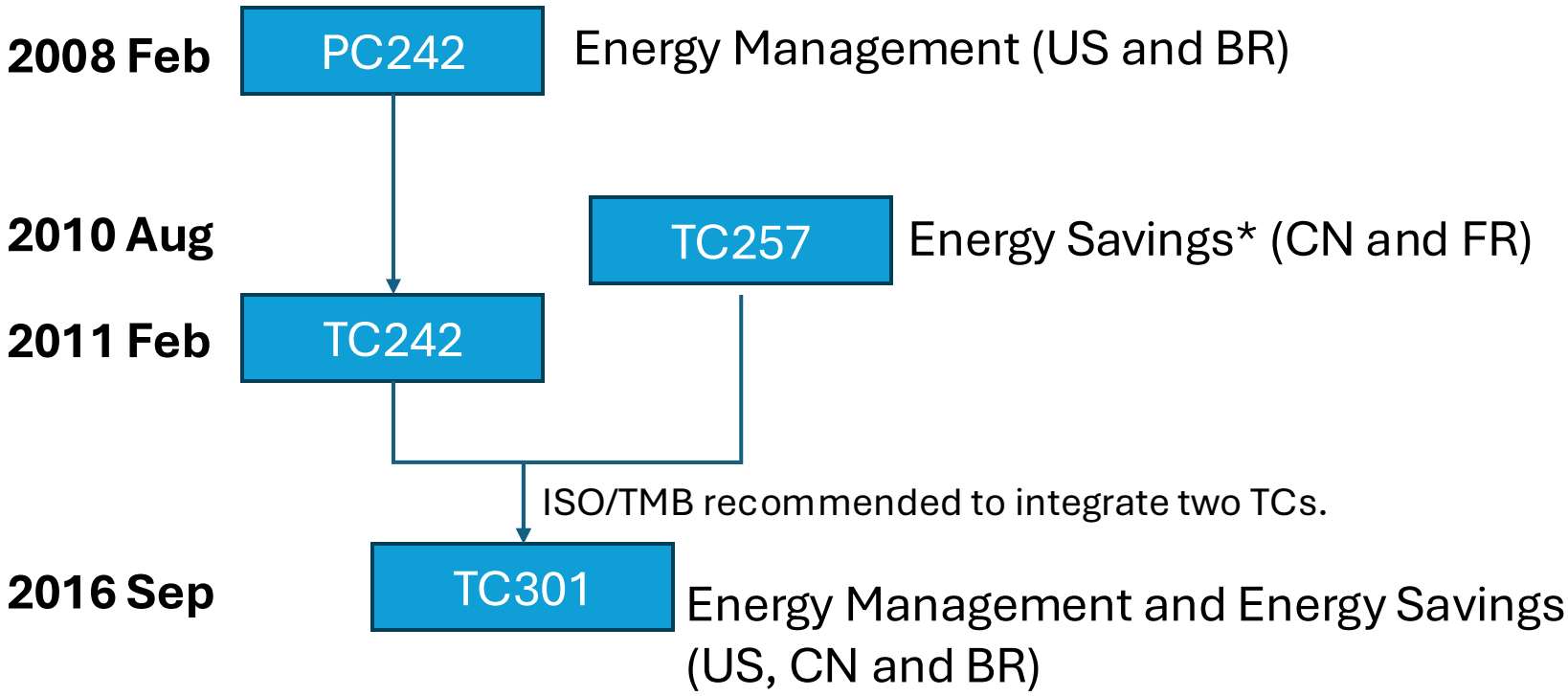
ISO TC301

Energy management system and energy savings

TC 301 Energy management and energy savings

- **Scope**

Standardization in the field of energy management and energy savings



*General technical rules for determination of energy savings in renovation projects, industrial enterprises and regions

Overview of ISO/TC301

Title	Energy Management and Energy Saving
Scope	Standardization in the field of energy management and energy savings
Chair/Co-Chair Secretariat	US/CN・BR US/CN
Participating Members (51)	Argentina、Australia、Austria、Belgium、Bolivia, Plurinational State of、Brazil、Canada、Chile、China、Colombia、Congo, The Democratic Republic of the、Costa Rica、Cyprus、Denmark、Ecuador、Egypt、Finland、France、Germany、India、Indonesia、Iran, Islamic Republic of、Ireland、Italy、Japan、Jordan、Korea, Republic of、Malaysia、Mauritius、Mexico、Montenegro、Morocco、Norway、Poland、Portugal、Romania、Russian Federation、Saint Lucia、Saudi Arabia、Singapore、South Africa、Spain、Sweden、Tanzania, United Republic of、Tunisia、Uganda、Ukraine、United Kingdom、United States、Uruguay、Zimbabwe
Observing Members (43)	Algeria、Azerbaijan、Barbados、Bulgaria、Burundi、Croatia、Cuba、Czech Republic、Dominican Republic、Eswatini、Gabon、Georgia、Guyana、Hong Kong Special Administrative Region of China、Hungary、Iraq、Israel、Kazakhstan、Kenya、Kyrgyzstan、Luxembourg、Macao Special Administrative Region of China、Moldova, Republic of、Mongolia、Myanmar、Namibia、Netherlands、Nigeria、Pakistan、Panama、Peru、Philippines、Rwanda、Slovakia、Sri Lanka、Sudan、Switzerland、Thailand、Togo、Türkiye、United Arab Emirates、Uzbekistan、Zambia

In April 2016, TC242 and TC257 were integrated and launched as TC301.

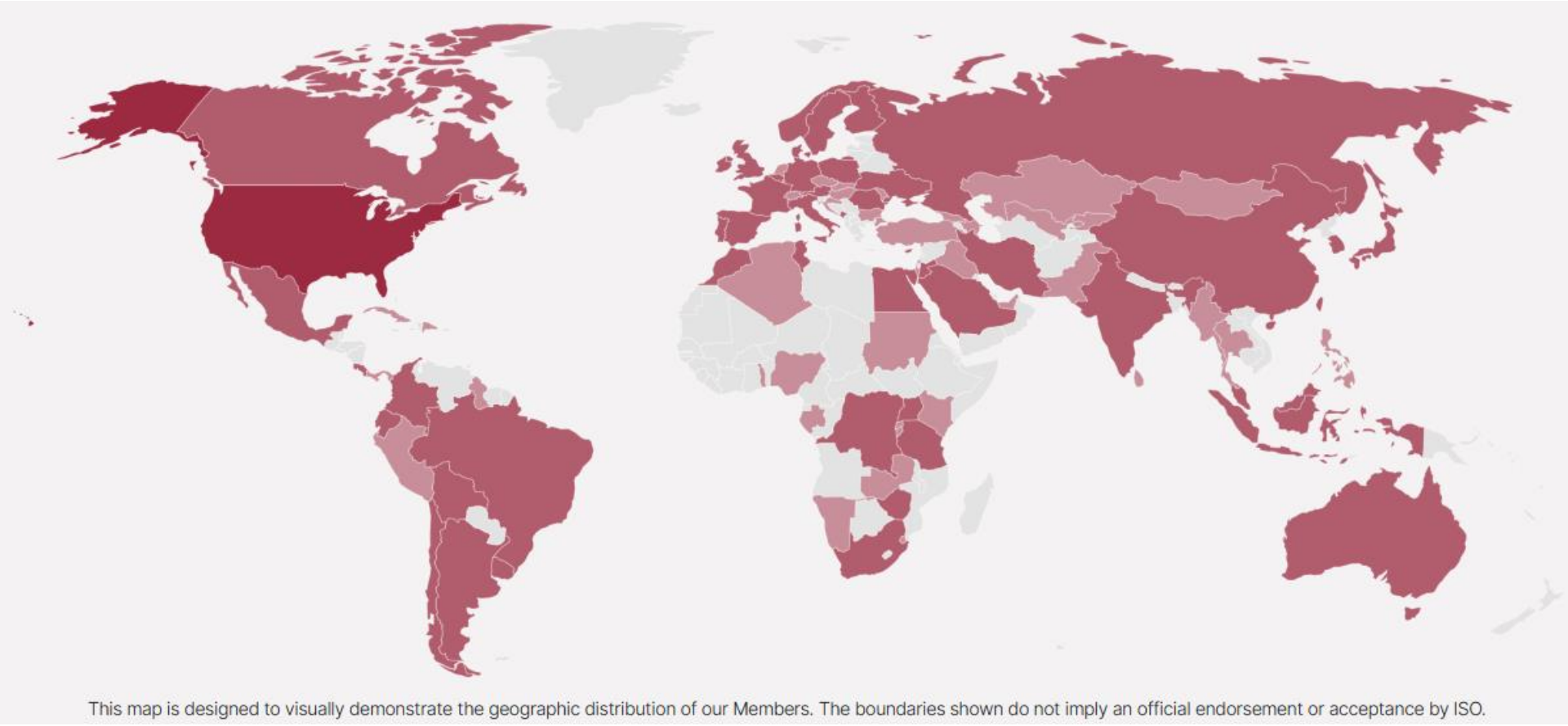
Participation to ISO/TC301

P Member 51

O Member 43

Secretary

As of 1st November 2024



Source :ISO Website

Active WGs in ISO/TC301

There has been no SC (sub-committee) because this TC has developed ISO 50001 and the standards that support its implementation, considering that most of the participating experts in these are overwrapped.

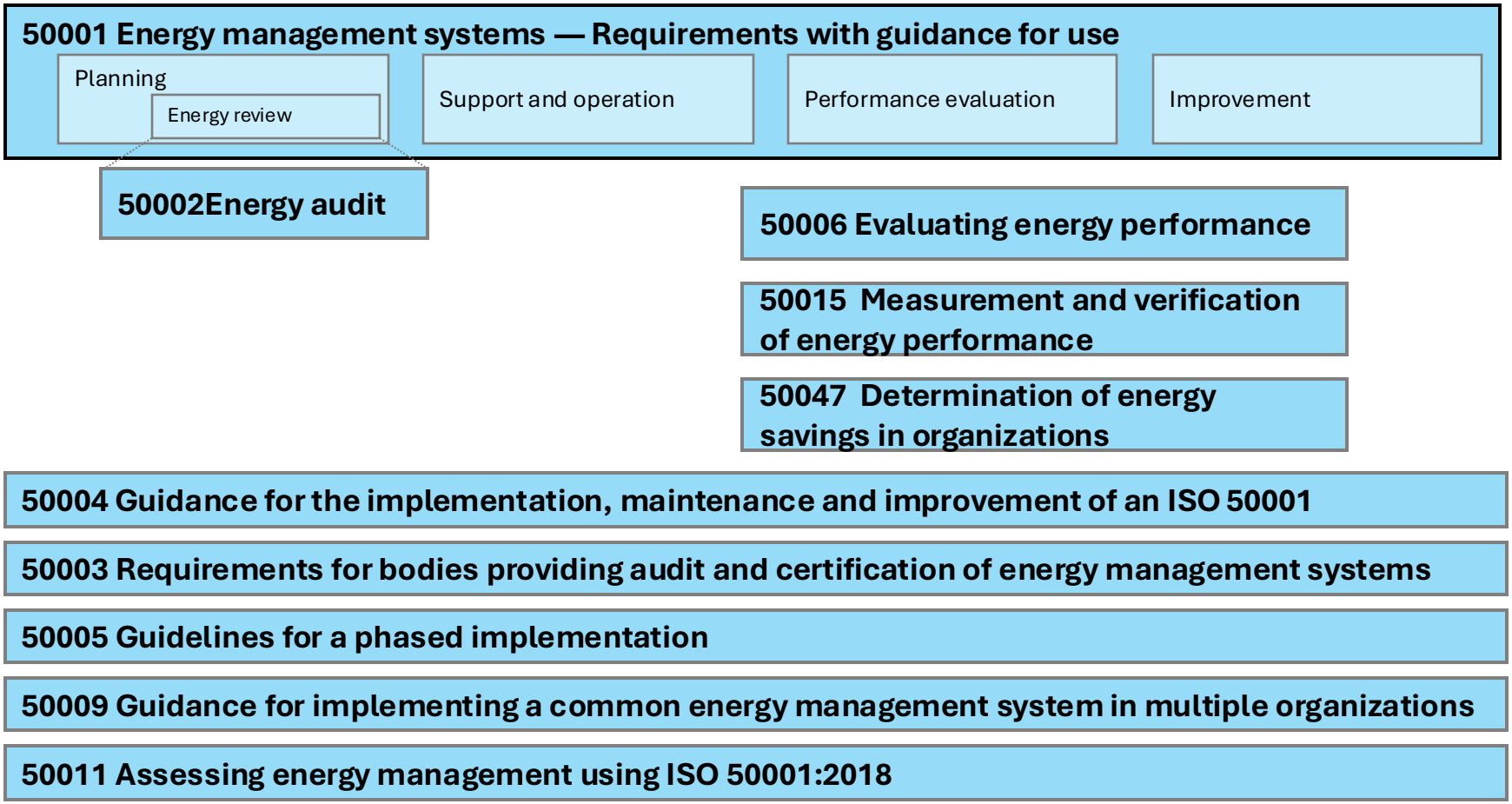
WG No.	Name
ISO/TC 301/AHG 12	Development of ISO 14019
ISO/TC 301/AHG 13	Integrated District Energy System (IDES)
ISO/TC 301/CAG	Chair's Advisory Group
ISO/TC 301/STTF 1	Spanish translation task force
ISO/TC 301/TG 2	Communication Task Group
ISO/TC 301/TG 3	Terminology Task group
ISO/TC 301/TG 5	Maintenance of requirements documents
ISO/TC 301/WG 1	Energy management
ISO/TC 301/WG 16	Net Zero Energy
ISO/TC 301/WG 17	Energy Audits
ISO/TC 301/WG 18	Energy data collection plan
ISO/TC 301/WG 19	Integrated District Energy System (IDES) Concepts and practices

The list of the standards developed in ISO/TC301

Standard	Title
ISO/IEC 13273-1:2015	Energy efficiency and renewable energy sources — Common international terminology — Part 1: Energy efficiency
ISO/IEC 13273-2:2015	Energy efficiency and renewable energy sources — Common international terminology — Part 2: Renewable energy sources
ISO 17741:2016	General technical rules for measurement, calculation and verification of energy savings of projects
ISO 17742:2015	Energy efficiency and savings calculation for countries, regions and cities
ISO 17743:2016	Energy savings — Definition of a methodological framework applicable to calculation and reporting on energy savings
ISO 50001:2018	**Energy management systems — Requirements with guidance for use**
ISO 50001:2018/Amd 1:2024	Energy management systems — Requirements with guidance for use — Amendment 1: Climate action changes
ISO 50002:2014	Energy audits — Requirements with guidance for use
ISO 50003:2021	Energy management systems — Requirements for bodies providing audit and certification of energy management systems
ISO 50004:2020	Energy management systems — Guidance for the implementation, maintenance and improvement of an ISO 50001 energy management system
ISO 50005:2021	Energy management systems — Guidelines for a phased implementation
ISO 50006:2023	Energy management systems — Evaluating energy performance using energy performance indicators and energy baselines
ISO 50007:2017	Energy services — Guidelines for the assessment and improvement of the energy service to users
ISO 50009:2021	**Energy management systems — Guidance for implementing a common energy management system in multiple organizations**
ISO/PAS 50010:2023	Energy management and energy savings — Guidance for net zero energy in operations using an ISO 50001 energy management system
ISO/TS 50011:2023	**Energy management systems — Assessing energy management using ISO 50001:2018**
ISO 50015:2014	Energy management systems — Measurement and verification of energy performance of organizations — General principles and guidance
ISO/TS 50044:2019	Energy saving projects (EnSPs) — Guidelines for economic and financial evaluation
ISO 50046:2019	General methods for predicting energy savings
ISO 50047:2016	Energy savings — Determination of energy savings in organizations
ISO 50049:2020	Calculation methods for energy efficiency and energy consumption variations at country, region and city levels

ISO50000 family

- ISO 50001 is the “core” standard in TC301.
- Most of other standards support its implementation.



ISO 50001:2023amd

- ISO 50001 is a standard for energy management system based on PDCA cycle.
- ISO 50001 is applicable to all organizations.
- The management system and energy performance are continuously improved.
- ISO 50001 is developed using the common structure for management systems and is easy to integrate with other management systems (e.g. environmental, quality, etc.)

4. Context of the organization
- Understanding the organization and its context
- Understanding the needs and expectations of interested parties
- Determining the scope of the energy management system
- Energy management system

5. Leadership
- Leadership and commitment
- Energy policy
- Organization roles, responsibilities and authorities

6. Planning
- Actions to address risks and opportunities
- Objectives, energy targets and planning to achieve them
- Energy review
- Energy performance indicators
- Energy baseline
- Planning for collection of energy data

EnMS: Energy management system



ISO50001:2018 Figure 1 Plan-Do-Check-Act Cycle

7. Support
- Resources
- Competence
- Awareness
- Communication
- Documented information

8.Operation
- Operational planning and control
- Design
- Procurement

9. Performance evaluation
- Monitoring, measurement, analysis and evaluation of energy performance and the EnMS
- Internal audit
- Management review

10. Improvement
- Nonconformity and corrective action
- Continual improvement

1.Scope
2.Normative references
3.Terms and definitions

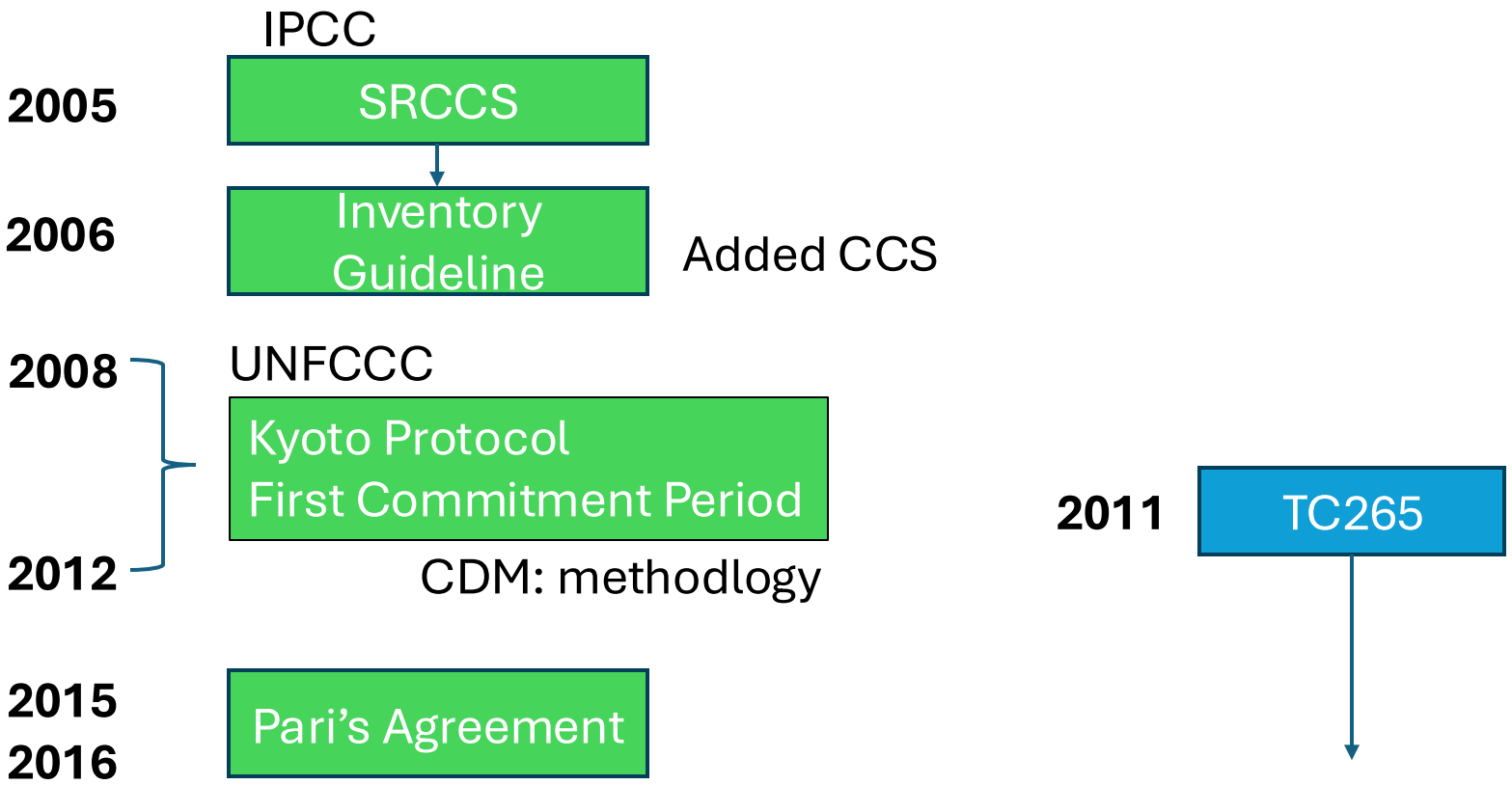
ISO TC265

Carbon dioxide capture, transformation, and geological storage

TC 265 Carbon dioxide capture, transportation, and geological storage

- **Scope**

Standardization of design, construction, operation, environmental planning and management, risk management, quantification, monitoring and verification, and related activities in the field of carbon dioxide capture, transportation, and geological storage (CCS).



Outline of ISO/TC265

Title	Carbon dioxide capture, transportation and geological storage
Scope	Standardization of design, construction, operation, environmental planning and management, risk management, quantification, monitoring and verification, and related activities in the field of carbon dioxide capture, transportation, and geological storage (CCS).
Chair Secretariat	Canada Canada/China
Participating Members (28)	**Australia**、Austria、Brazil、**Canada**、**China**、Denmark、Finland、**France**、**Germany**、Iceland、India、Indonesia、Ireland、**Japan**、Korea, Republic of、Malaysia、**Netherlands**、**Norway**、Portugal、Russian Federation、Saudi Arabia、Singapore、**South Africa**、Sweden、**Switzerland**、United Arab Emirates、**United Kingdom**、United States
Observing Members (17)	Argentina、Belgium、Czech Republic、Egypt、Hungary、Iran, Islamic Republic of、**Italy**、Luxembourg、Mexico、New Zealand、Poland、Qatar、Romania、Serbia、Spain、Sri Lanka、Thailand

In Oct. 2011, establish by Canada proposal

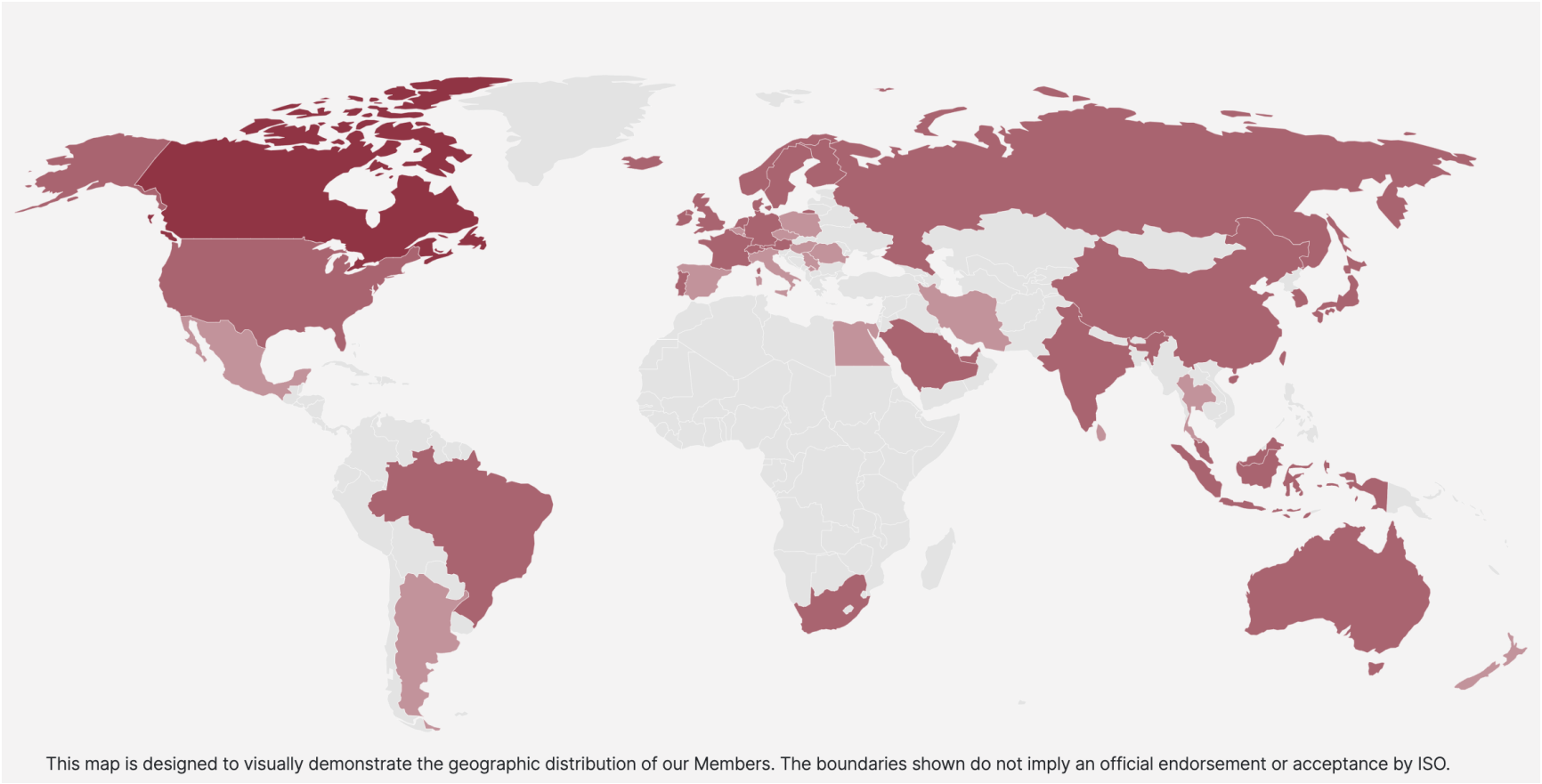
Participation to ISO/TC265

P Member 28

O Member 17

Secretary

As of 1st November 2024



Source :ISO Website

Active WGs in ISO/TC265

There has been no SC (sub-committee) because this TC has developed encompass the entire system of CCS.

WG No.	Name
ISO/TC 265/AHG 1	Brand new market needs of quantitative analysis of the CO2 content for CO2 captured product
ISO/TC 265/AHG 2	Management of Q and V
ISO/TC 265/CAG	Chair's Advisory Group
ISO/TC 265/WG 1	Capture
ISO/TC 265/WG 2	Transportation
ISO/TC 265/WG 3	Storage
ISO/TC 265/WG 5	Cross Cutting Issues
ISO/TC 265/WG 6	EOR Issues
ISO/TC 265/WG 7	Transportation of CO_2 by Ship

The list of the standards developed in ISO/TC265

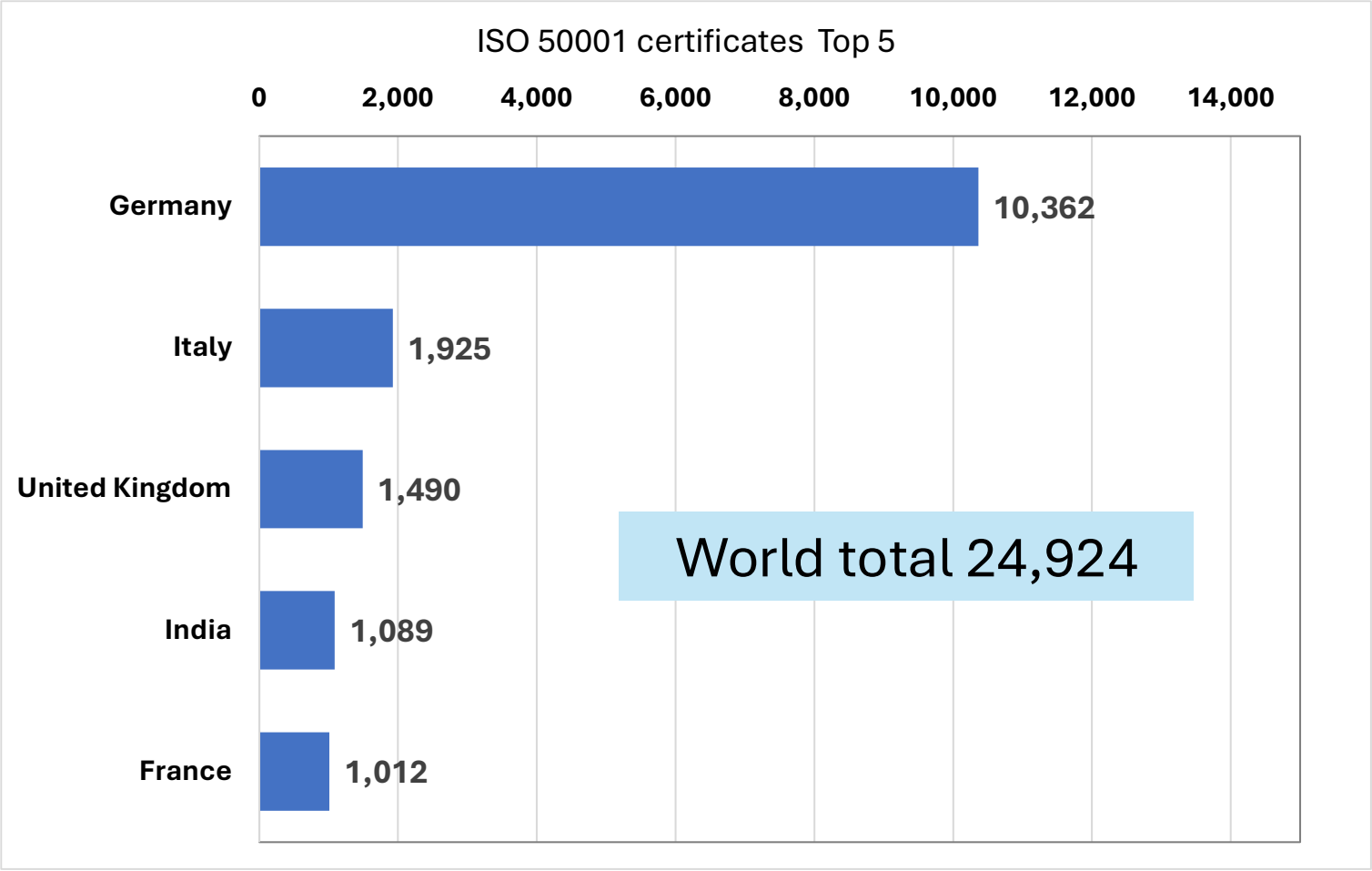
WG	No.	Title	Publish
WG1 (Capture)	TR27912	Carbon dioxide capture systems, technologies and processes	2016/5
	ISO27919-1	Part 1: Performance evaluation methods for post-combustion CO2 capture integrated with a power plant	2018/9
	TR27922	Overview of carbon dioxide capture technologies in the cement industry	2021/2
	ISO27919-2	Part 2: Evaluation procedure to assure and maintain stable performance of post-combustion CO_2 capture plant integrated with a power plant	2021/9
	ISO27927	Key performance parameters and characterization methods of absorption liquids for post-combustion CO2 capture	Under development
	ISO27928	Performance evaluation methods for CO2 capture connected to a CO2 intensive plant	Under development
WG2 (Transportation)	ISO27913	Pipeline transportation systems	2024/1
WG3 (geological storage)	ISO27914	Geological storage	2017/10
	TR27923	Injection operations, infrastructure and monitoring	2022/1/17
WG4 (Q&V)	TR27915	Quantification and verification	2017/8
WG5 (Closs cutting issue)	ISO27917	Vocabulary — Cross cutting terms	2017/12
	TR27918	Lifecycle risk management for integrated CCS projects	2018/4
	TR27921	Cross Cutting Issues — CO2 stream composition	2020/5
WG6(EOR)	ISO27916	Carbon dioxide storage using enhanced oil recovery (CO2-EOR)	2019/1
	TR27926	Carbon dioxide enhanced oil recovery (CO2-EOR) — Transitioning from EOR to storage	Under development
WG7（ship transportation）	TR27929	Transportation of CO2 by ship	2024/10
AdHoc Gr (Flow Assurance)	TR27925	Flow assurance	2023/7

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Thank you for the attention

Deployment of ISO 50001

- ISO 50001 is deployed especially in countries with financial or other support schemes.



Source: ISO survey 2023

Ongoing and future plan in ISO/TC301

- GHG reduction has been considered “as a result of energy management” in TC 301. Not only energy management but also changes in primary energy supply can improve organization’s GHG emissions. However, in response to surging demand for GHG reduction, the development of the following standard was proposed.
- ISO/CD24492.3 (ISO 50100) Energy management systems and energy savings -- **Decarbonization** — Requirements with guidance for use
- **This document specifies requirements and guidance to enable an organization to reduce its energy related greenhouse gas (GHG) emissions.**
- This document:
  - a) is applicable to any organization regardless of its type, size, complexity, geographical location, organizational culture or the products and services it provides;
  - b) is applicable to Scope 1 emissions related to energy and Scope 2 emissions;
  - c) is applicable irrespective of the quantity, use, or types of energy consumed;
  - d) requires demonstration of absolute reduction of energy related GHG emissions aligned with emission reduction target(s);
  - e) ISO 50001 is required as a part of this document.
  - Note: Organizations can include some or all categories of Scope 3 emissions within the scope of their EnMS based on the organization’s management decisions.
- Annexes also provide guidance for the use, guidance on managing Scope 3 emissions, and guidance on the relationship between this document and ISO 50001.

EnMS: Energy management system

Japan's active contribution to ISO/TC301

- Participation as P-member since the start of PC242
  - Provided technical comments to harmonize domestic regulations and their methodologies. E.g. Use of energy intensity etc.
- Leadership for development of standards
  - ISO 50002:2014 Energy audits — Requirements with guidance for use
    - Mr. Akira Ishihara, Co-convenor with UK
  - ISO 50009:2021 Energy management systems — Guidance for implementing a common energy management system in multiple organizations
    - Mr. Shigeki Sakamoto, Co-convenor with UK
  - ISO/TS 50011:2023 Energy management systems — Assessing energy management using ISO 50001:2018
    - Mr. Tomoyuki Ikeyama, Project leader