CGPM

Evolving needs in metrology – introduction to Draft Resolution A

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November 2022

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Besoins dans le domaine de la métrologie – introduction au projet de résolution A

27e réunion de la Conférence générale des poids et mesures

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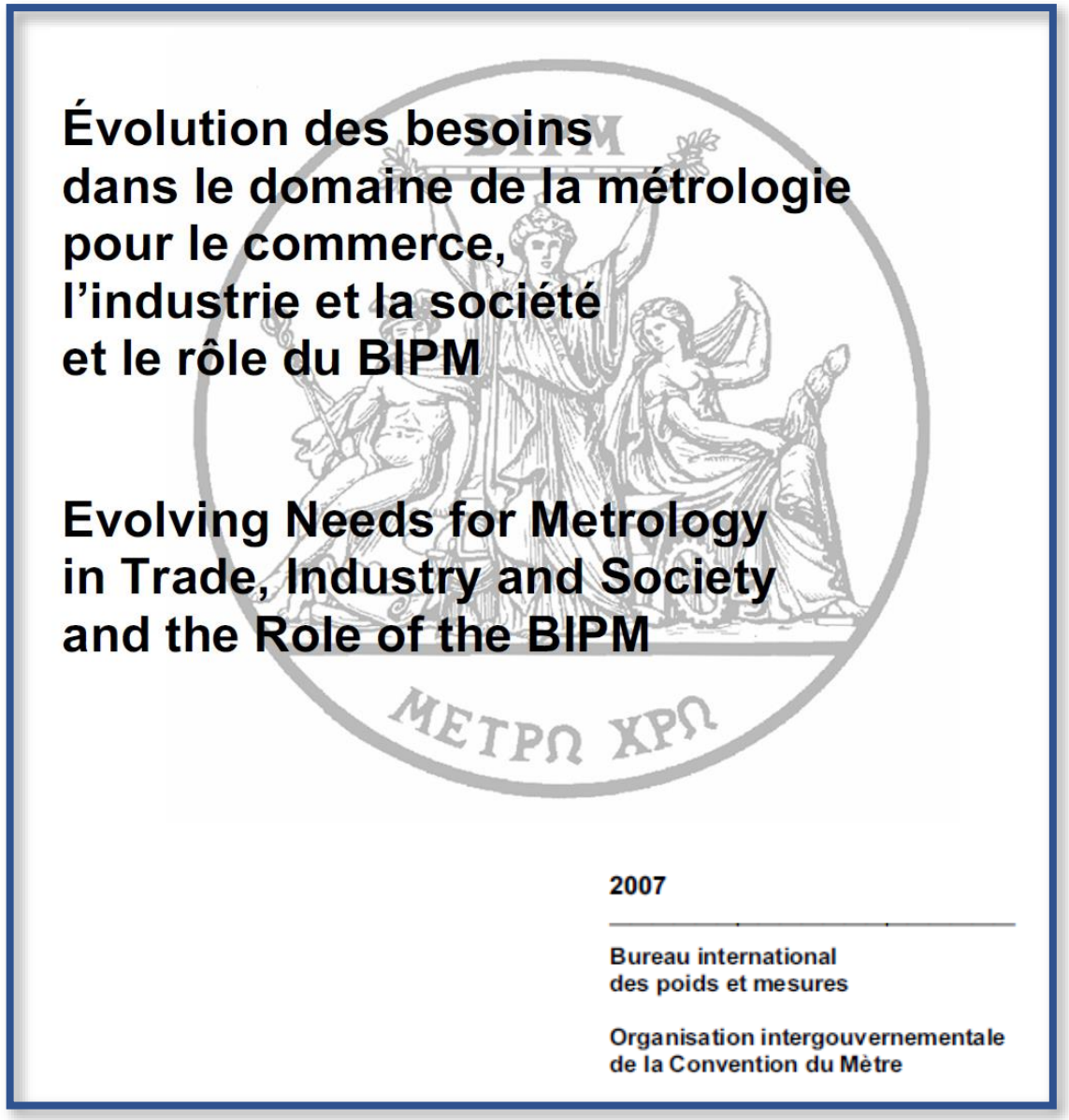
Evolving needs in metrology

Blevin 1998, Kaarls 2003, Kaarls 2007:

“Outline of the long-term national and international needs relating to metrology, and how these can be met through international collaboration.

Outline the unique role that the International Bureau of Weights and Measures (BIPM) can play in meeting these needs.”



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Evolving needs in metrology – re-evaluation

The Blevin and Kaarls reports played an important role in steering (inter)national metrology and stimulated international cooperation

Following the revision of the SI, the CIPM felt the need to re-evaluate these Reports:

- What changes and challenges in society and economies are creating new needs for metrology?
- How can the CIPM/BIPM best respond *to ensure that metrology remains relevant in the 21st century* and continues to deliver society impact?

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Evolving needs in metrology in the 21st century

In the 20th century, needs were mainly related to technical disciplines, reflected at the CIPM level in discipline-based Consultative Committees

Metrology needs in the 21st century are notably different in character:

- Triggered by regional or even world-wide challenges
- Linked to rapid technology developments (e.g. “digital revolution”)
- Horizontal nature, requiring cooperation of many metrology disciplines

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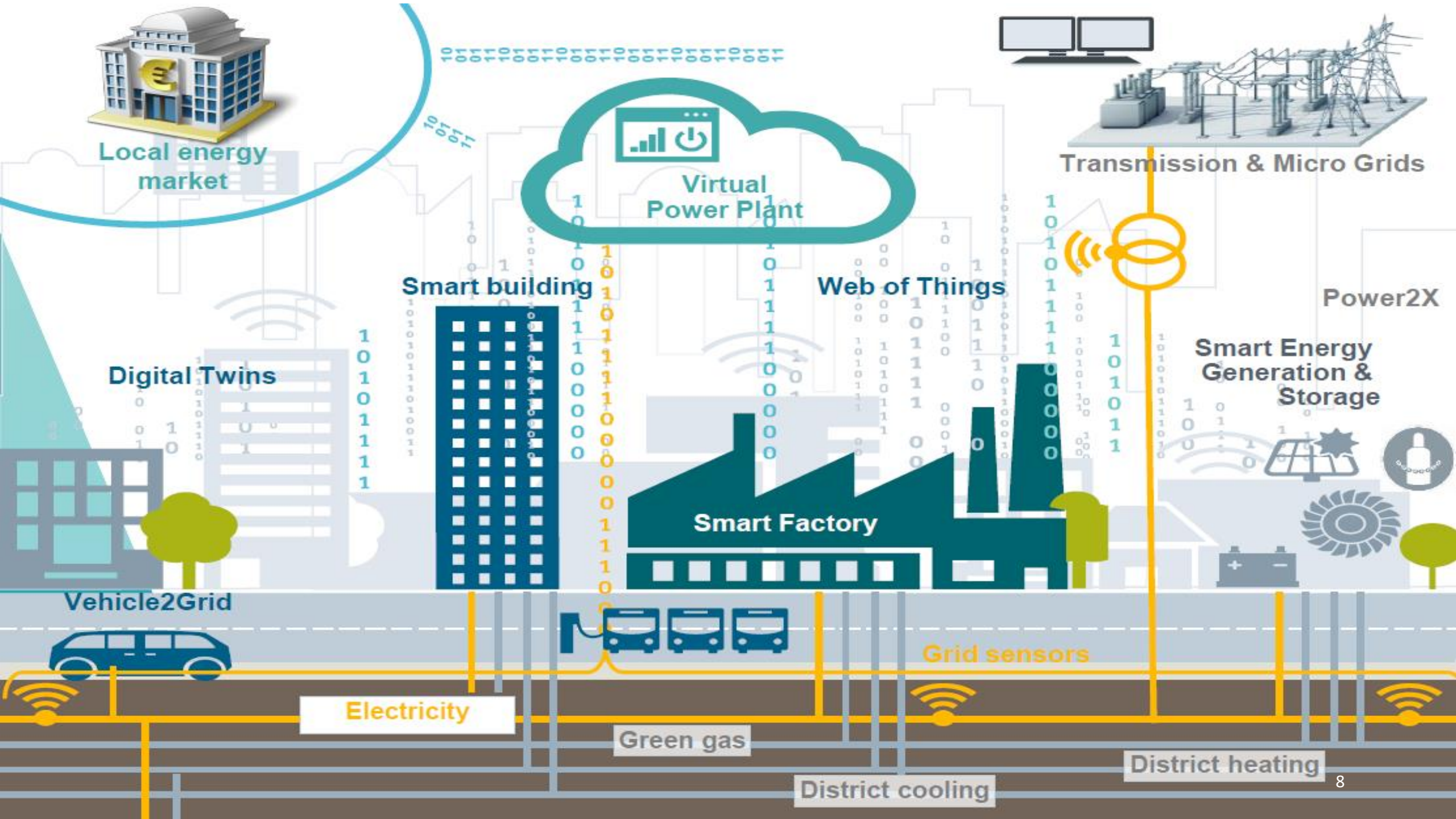
21st Century Metrology Grand Challenges

The CIPM identified five “Metrology Grand Challenges”:

- Climate change and environment
- Health and life sciences
- Food safety
- Energy
- Advanced manufacturing

Next to cross-cutting challenges related to *how* we make measurements:

- Digital Transformation
- “New” metrology (e.g. sensor networks, NMI-on-a-chip)


Local energy market
Virtual Power Plant
Transmission & Micro Grids
Smart building
Web of Things
Power2X
Digital Twins
Smart Energy Generation & Storage
Smart Factory
Vehicle2Grid
Grid sensors
Electricity
Green gas
District heating
District cooling

How to move forward?

The CIPM proposes

> *to create appropriate forums to shape and coordinate the metrology community's response to the identified grand challenges with the objective to coordinate new possibilities for metrology to have an impact on global cross-cutting challenges.*

and

> *to start to develop a new vision for the work of the BIPM that builds on this report, that should be consulted upon with the global metrology community before the 150th anniversary of the BIPM in 2025 and for publication before the 28th meeting of the CGPM, expected to be in 2026*

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Draft resolution A – background

The General Conference on Weights and Measures (CGPM), at its 27th meeting,

recalling

- Resolution 2 adopted by the CGPM at its 23rd meeting (2007) that invited the International Committee for Weights and Measures (CIPM) to report to subsequent General Conferences on the evolving needs in metrology and to prepare proposals for initiatives to be taken by the International Bureau of Weights and Measures (BIPM) at the international level,
- Resolution 1 adopted by the CGPM at its 26th meeting (2018) on the revision of the International System of Units (SI) that defined the seven base units in terms of fixed numerical values of the defining constants that introduced new opportunities for the realization of the units,
- Resolution 3 adopted by the CGPM at its 26th meeting (2018) that welcomed the development of a long-term strategic view which, together with a consolidated planning process, underpins the development of the BIPM work programme in consultation with Member States,

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Draft resolution A – motivation

noting

- the essential role of the International System of Units (SI) in providing confidence in the accuracy and global comparability of measurements needed for international trade, manufacturing, human health and safety, protection of the environment, global climate studies and scientific research,
- the critical role of metrology in addressing global challenges, including climate change and environment, health and life sciences, food safety, energy, advanced manufacturing, digital transformation and countering global pandemics,
- the increasingly multidisciplinary nature of measurement in new or disruptive technologies, and the new requirements for metrology in digital technologies, sensor networks, and big data,

welcoming the report of the CIPM on the "Evolving needs in metrology",

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Draft resolution A – call for action!

encourages the CIPM

- to develop a long-term vision for an international measurement system that will remain relevant and adequately address new metrology challenges,
- to establish inter-disciplinary ("horizontal") groups that will address these new challenges and will be complementary to the existing quantity-based ("vertical") structure of its Consultative Committees,
- to mark the 150th anniversary of the signing of the Metre Convention (on 20 May 2025) by outlining a new vision for the BIPM that builds on the CIPM report on the "Evolving Needs in Metrology" and is based on a review of the achievements of the BIPM and the future requirements for its work,
- to consult widely on its proposal for a new vision for the BIPM to be presented at the 28th meeting of the CGPM (2026),

and invites Member States and National Metrology Institutes to contribute to the work of the CIPM in addressing the evolving needs for metrology and in developing a new vision for the BIPM.

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Climate change and environment

The CIPM decided to establish a Sectorial Task Group on Climate Change and Environment given the urgency to act on this theme.

What are the objectives of the STG?

- To advise the CIPM
- To provide inputs to the CCs
- To liaise with RMO forums

EUROPEAN METROLOGY NETWORKS

Asia Pacific Metrology Programme

FOCUS GROUP ON CLIMATE CHANGE AND CLEAN AIR

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Sectorial Task Group on environment and climate change

Which are the envisaged activities?

- To facilitate the dialogue between NMIs and stakeholders
- To articulate internationally accepted metrology challenges in the field
- To encourage collaboration between CCs, NMIs and stakeholders

The STG will be started for an initial period of 4 years. After these initial 4 years, the CIPM will decide whether the task group will be continued, and if so, in what form.

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Sectorial Task Group on environment and climate change

Involvement

- Experts in the field with the ability to take a broad view on the subject
- Expertise covering the breadth of the field
- Not limited to NMIs and DIs

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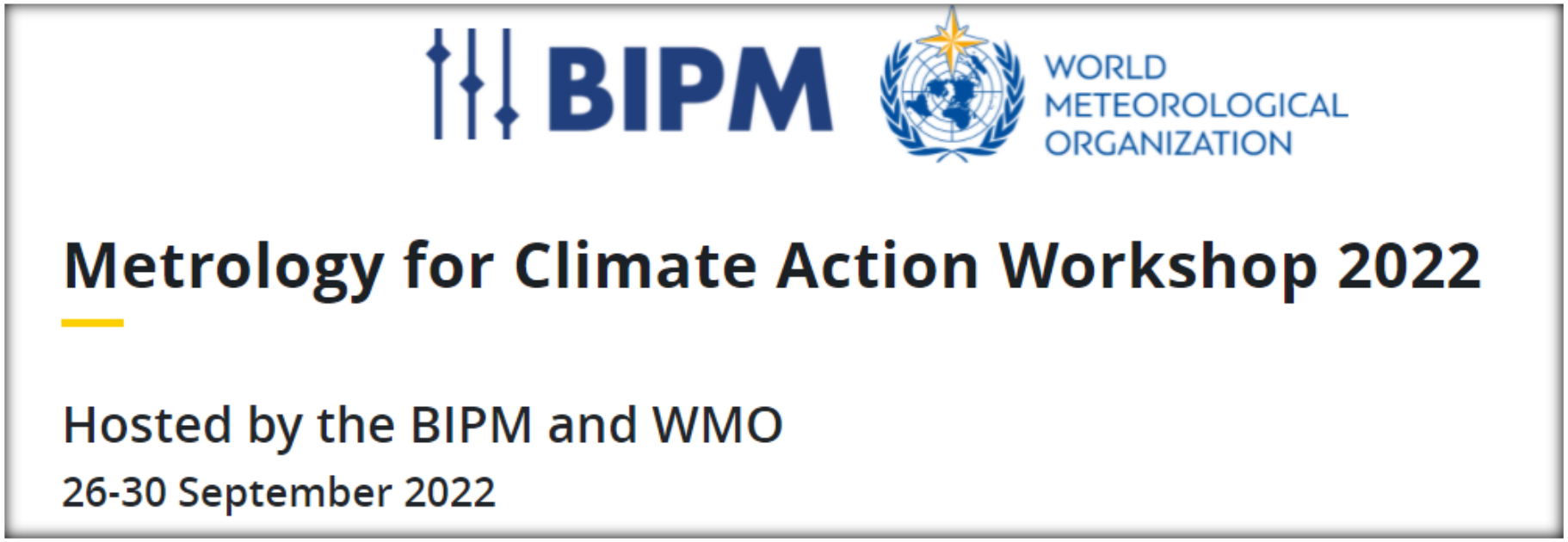
BIPM Climate workshop



~ 1000 scientists from all around the world came together to identify the requirements for further developments on metrology to support the adaptation to and mitigation of climate change

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Next steps

The main output of the workshop is a set of recommendations on key technical challenge areas that the metrology community should tackle and will enable it to work on addressing climate change causes, and mitigation and adaptation activities.

This will set the agenda for measurement services and research in metrology in support of the Environment and Climate for the next ten-year period.

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