

EURAMET

as Regional Metrology Organisation

and its role in the CIPM MRA

Wolfgang Schmid, Head of Secretariat

FG on Facilitating National Metrology Infrastructure Development

CIPM MRA workshop

Skopje, FYR Macedonia, 27 to 29 April 2011

OUTLINE:

- ☐ **Regional Metrology Organisations (RMO)**
- ☐ **EURAMET as European RMO**
- ☐ **EURAMET and the CIPM MRA**
- ☐ **European Metrology Research Programme (EMRP)**
- ☐ **Technical Assistance Activities within EURAMET**

Regional Metrology Organisations (RMO)



RMOs coordinate the collaboration
between National Metrology Institutes (NMI) within a region



- Facilitating traceability to primary realisations of the SI
- Coordination of inter-comparisons of national measurement standards
- Mutual review of technical competencies and quality systems
 - *Equivalence and international recognition of national standards & services*
- Cooperation in metrology research and development
- Joint training and consultation
- Sharing of technical capabilities and facilities
- Development of standardised procedures and guidance documents
- Policy advice to decision makers
- ... and others more

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Milestones in the cooperation of NMIs in Europe



1988 Establishment of EUROMET

“European Collaboration in Measurement Standards” (MoU)



1999 Signature of the CIPM MRA

RMOs as key player in the implementation of the MRA



2003 MERA Project

Feasibility study on future development of European metrology

2005 iMERA Project

“Implementing the Metrology European Research Area”
Design and establishment of EURAMET as legal entity



2007 Inauguration of EURAMET e.V.

“European Association of National Metrology Institutes”

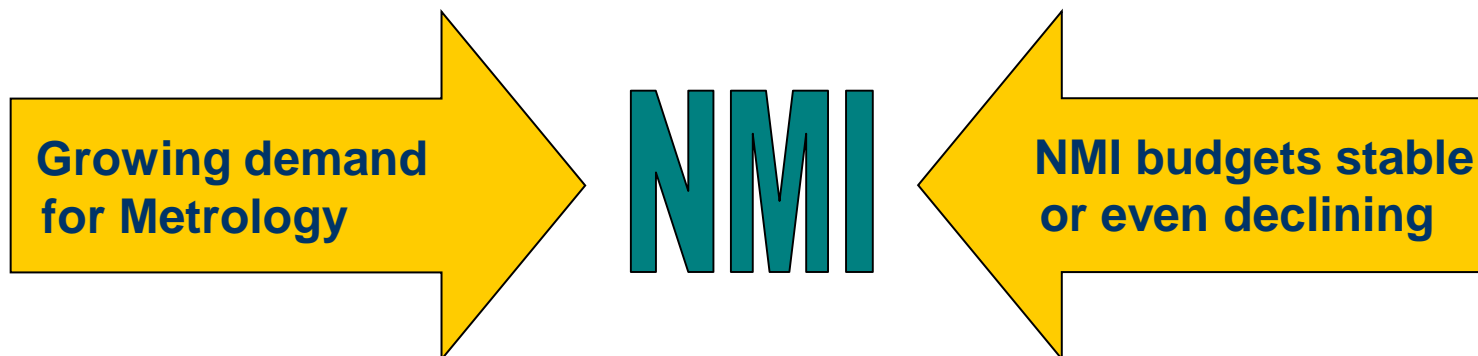


2007 Launch of the EMRP

“European Metrology Research Programme”



The “Metrology Dilemma”



- **Traditional areas of industry**
 - becoming more complex
 - requiring broader measurement ranges and lower uncertainties
- **New areas of technology**
e.g. nano-technology or biotechnology
- **Areas in which metrology is increasingly recognised**
e.g. chemistry, clinical analysis, food safety

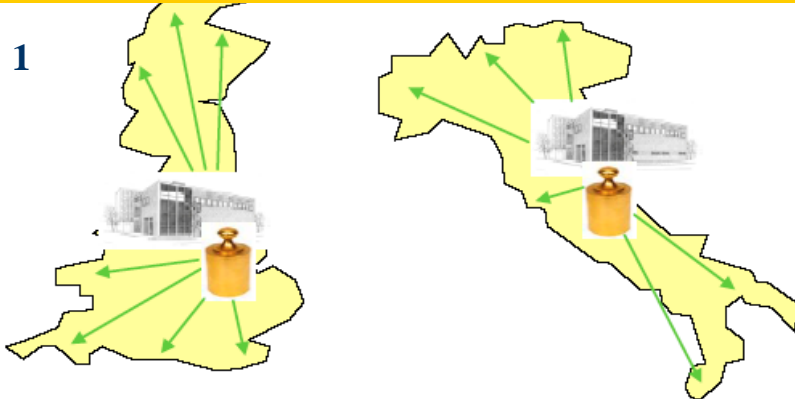
AMERA Study: 2002/2003

- How to address the evolving needs with not-growing national budget for metrology?
- Can the European “Metrology Dilemma” be addressed through closer collaboration?

Funded by the European Commission (EC)

Comprehensive national provision

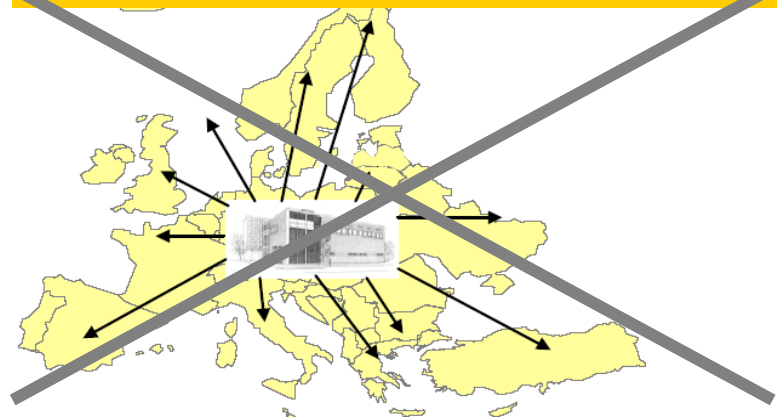
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at present

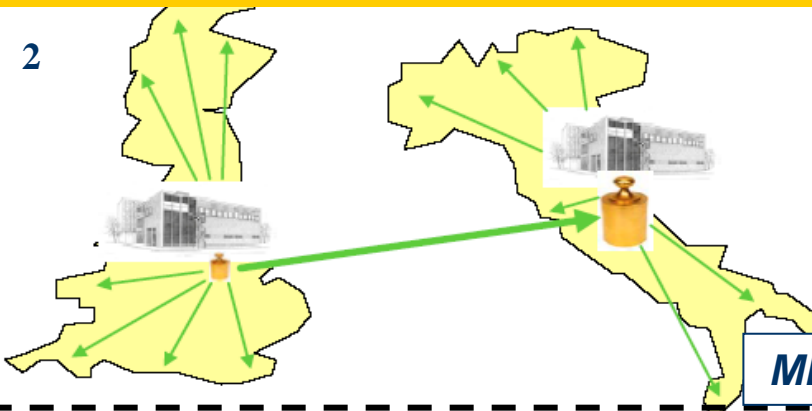
Single European Institute

4



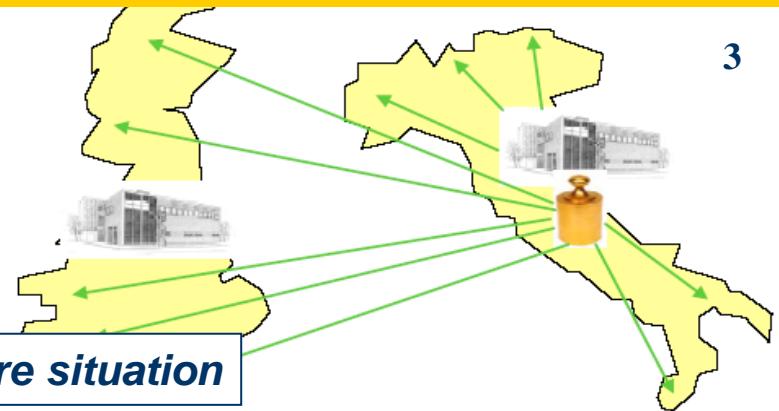
Selected standard holders

2



Specialized centers of excellence

3



MERA: future situation

Future development of European metrology infrastructure

- Evolution not Revolution
- **Local delivery of services** and expertise is **valued**
- devolution not an issue for most NMIs
- **High potential** for increasing efficiency and efficacy
via closer cooperation in R&D
- Arrangements are needed to enable
strategic planning of longer term R&D collaboration
- Scope for improved planning and sharing of facilities
- **EUROMET to evaluate its own structures**



Complete report available:
<http://www.euramet.org/index.php?id=documents>

The iMERA Project



iMERA

= “implementing the
Metrology European Research Area”

EC “ERA-NET” Coordinating Action

04/2005 to 12/2008

Coordinated by NPL

Major Objectives:

- Elaboration of an **EMRP**
= European Metrology Research Programme
- Establishment of **Structures**
for the execution of the EMRP
- **Funding Aspects:**
ERA-NET Plus, A-169 (*now A-185*)
- Knowledge Transfer



Inauguration of **EURAMET e.V.**

11th January 2007
Berlin, Germany



EURAMET e.V.



- Inaugurated in 2007
- Successor of EUROMET
- Legal Entity: German non profit association

Members:

36 European NMIs

Associates:

IRMM (EC)

1 NMI applying for membership

68 DIs (Designated Institutes)

Liaison Organisations:

4 RMOs, BIPM

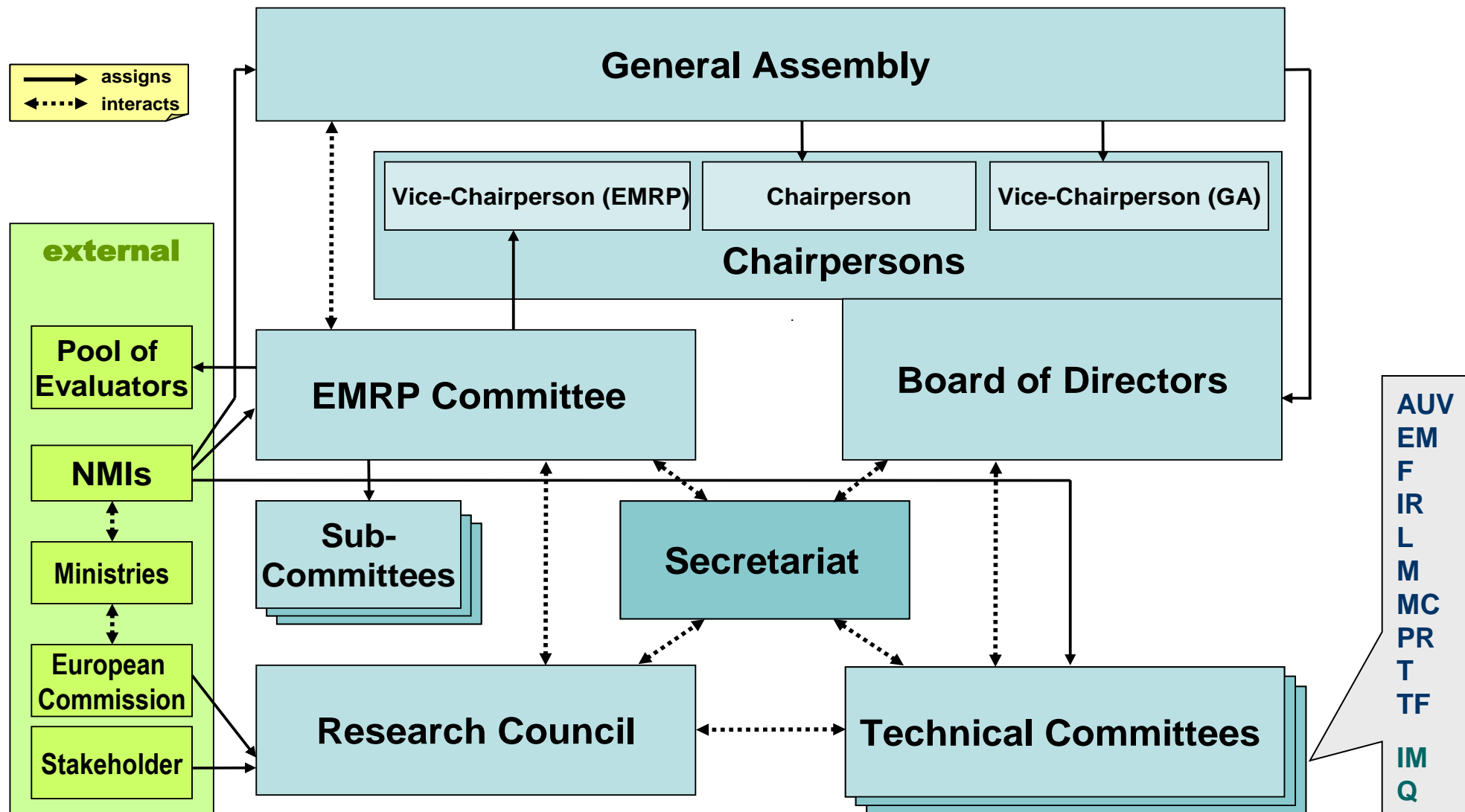
3 NMIs beyond Europe

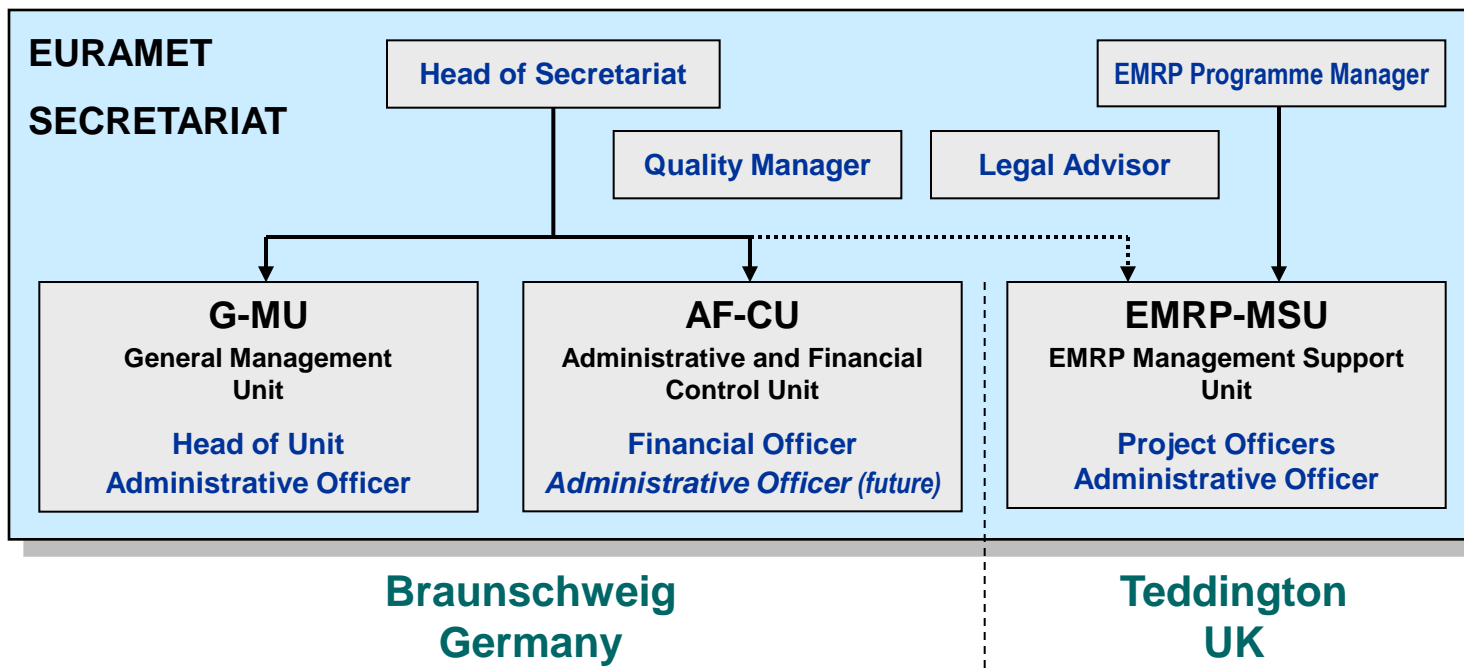
KDM (Kosovo under UNSCR 1244)

6 regional/international Organisations



Internal Organisation





Head of Secretariat:

Wolfgang Schmid

EMRP Programme Manager:

Duncan Jarvis

Quality Manager:

Enver Sadikoglu (10%)

Legal Advisor:

Barbara Tafel (10%)

- 2 sites (Braunschweig and Teddington)
- Permanent staff, part of it directly employed by EURAMET
- Supported by secondments from Members for specific tasks and projects

EURAMET e.V. - Secretariat

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Mail: secretariat@euramet.org

[http:// www.euramet.org](http://www.euramet.org)

Secondments in 2010

Haris Memic, IMBiH, Bosnia and Herzegovina:

- Follow-up of FG-FNMID activities

continuous

Majlinda Hoxha, DPM, Albania:

- Preparation of a training course

April 2010

Silvie Hoffmanova, CMI, Czech Republic:

- Analysis of the registration information of A-DIs

continuous

Enver Sadikoglu, UME, Turkey:

- EURAMET Quality Manager



❑ **Cooperation in National Measurement Standards:**

- Facilitating traceability to the SI
- International recognition: CIPM MRA

❑ **Cooperation in R&D in Metrology:**

- Research projects of the TCs (“ad-hoc”)
- Coordinated research programmes co-financed by the EC: EMRP

❑ **Infrastructural Support & Knowledge Transfer:**

- Facilitating national metrology infrastructure development (emerging members)
- Cooperation with EC in development programmes
- Development of KT material

❑ **Policy Advice, Liaison Activities, Publicity:**

- Cooperation with European organisations in Q-Sector: EA, WELMEC, CEN, ...
- Strengthening links to the European Commission (EC)
- Metrology congresses: participation / co-organisation

Financing of EURAMET Activities

<u>Source</u>	<u>Use</u>	<u>Budget 2010</u>
1. Membership fees (Members + Associates)	General operation of EURAMET	230 k€
2. EMRP management fees	Coordination of EMRP + researcher grants	1,6 M€
3. Research funds EC	Joint Research Projects + researcher grants	16,4 M€
4. Technical assistance funds of PTB	Support to FG activities (development cooperation)	150 k€
5. EURAMET Members BEV, MIRS, UME, EIM	Support to FG activities in kind and cash support	

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- ☐ European Metrology Research Programme (EMRP)
- ☐ Technical Assistance Activities within EURAMET
- ☐ Conclusions and Outlook

The CIPM MRA:

Mutual Recognition Arrangement

Reconnaissance mutuelle

des étalons nationaux de mesure
et des certificats d'étalonnage et de mesurage
émis par les laboratoires nationaux de métrologie

Paris, le 14 octobre 1999



Mutual recognition
of national measurement standards
and of calibration and measurement certificates
issued by national metrology institutes

Paris, 14 October 1999

Comité international des poids et mesures

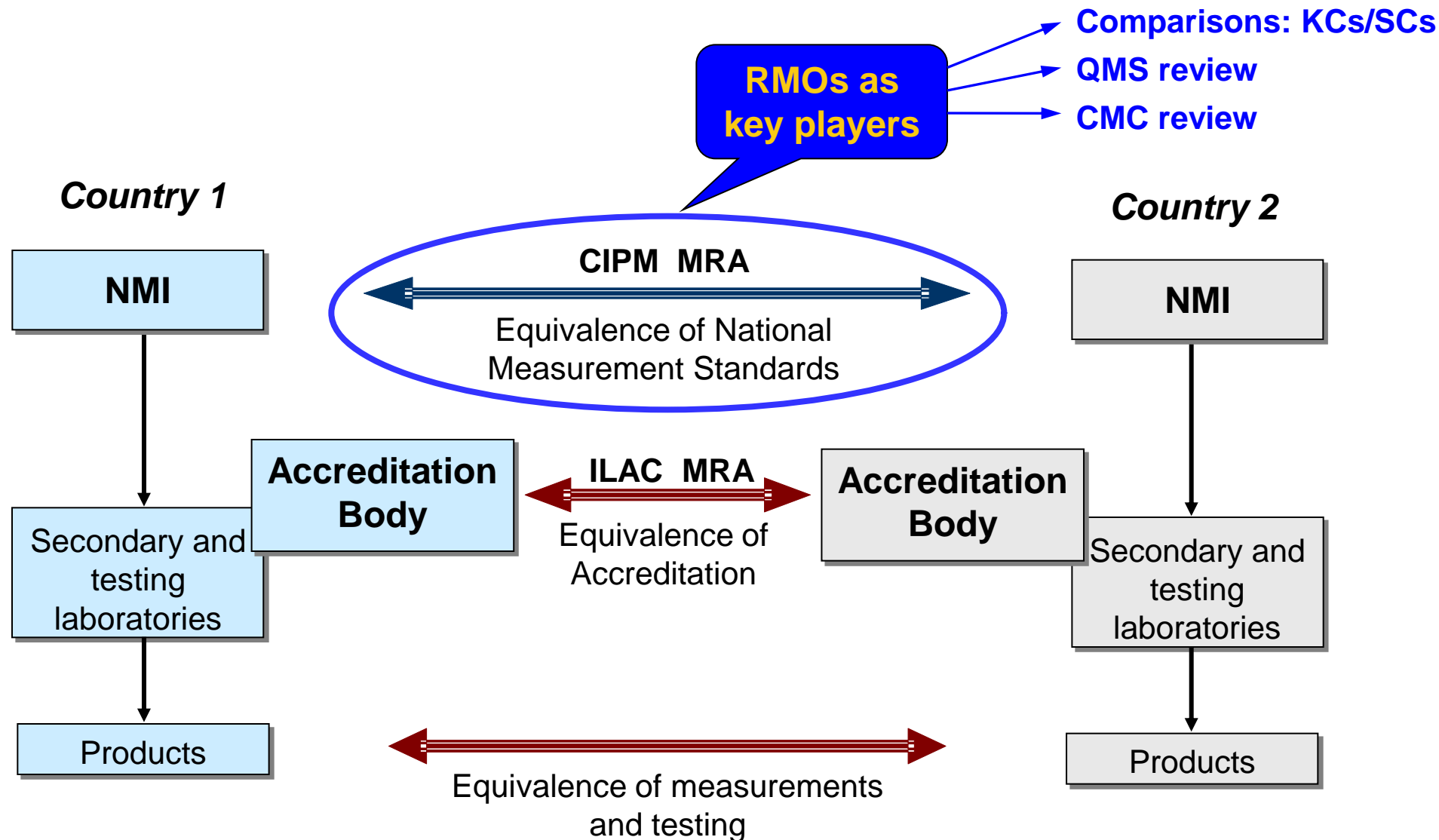
Bureau
international
des poids
et mesures

Organisation
intergouvernementale
de la Convention
du Mètre



- Establishes the degree of **equivalence of national measurement standards**
- Provides for **mutual recognition of calibration and measurement certificates** issued by NMIs
- Provides governments and other parties with a sound technical foundation for wider arrangements

Equivalence of measurements



❑ **Interlaboratory comparisons:**

NMI can participate in

- CC KC (only if member of the CC)
- EURAMET KC or SC (coordinated by the concerned EURAMET TC)

❑ **QMS review:**

EURAMET TC-Q is carrying out the QMS review and provides confidence

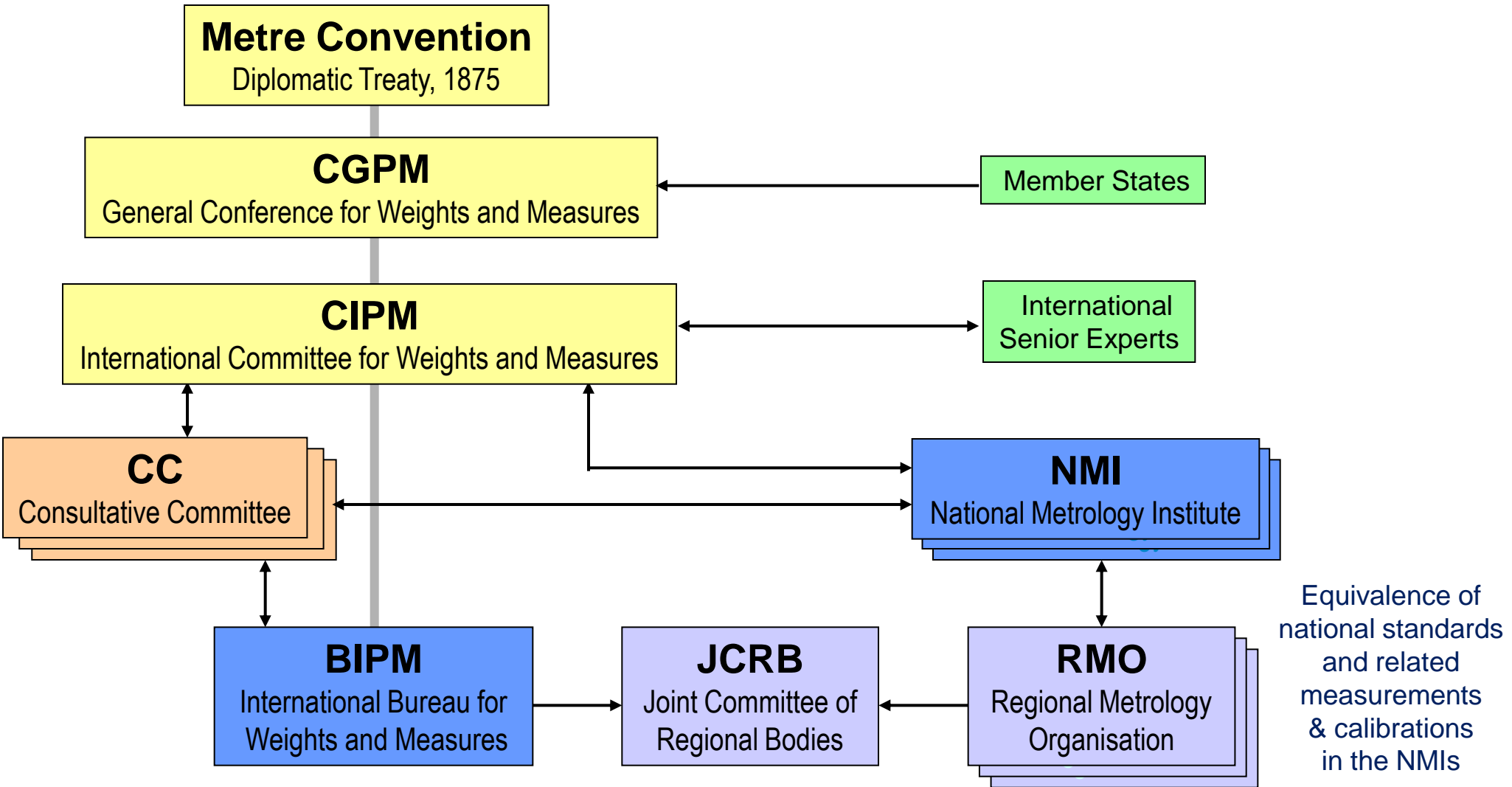
- following the guiding principles established by the JCRB
- establishing own rules and procedures

❑ **CMC review:**

Two-step approach

- 1) intra-RMO review, carried out under responsibility of concerned EURAMET TC
- 2) inter-RMO review of the CMCs approved in the intra-RMO review coordinated by BIPM (JCRB Executive Secretary)

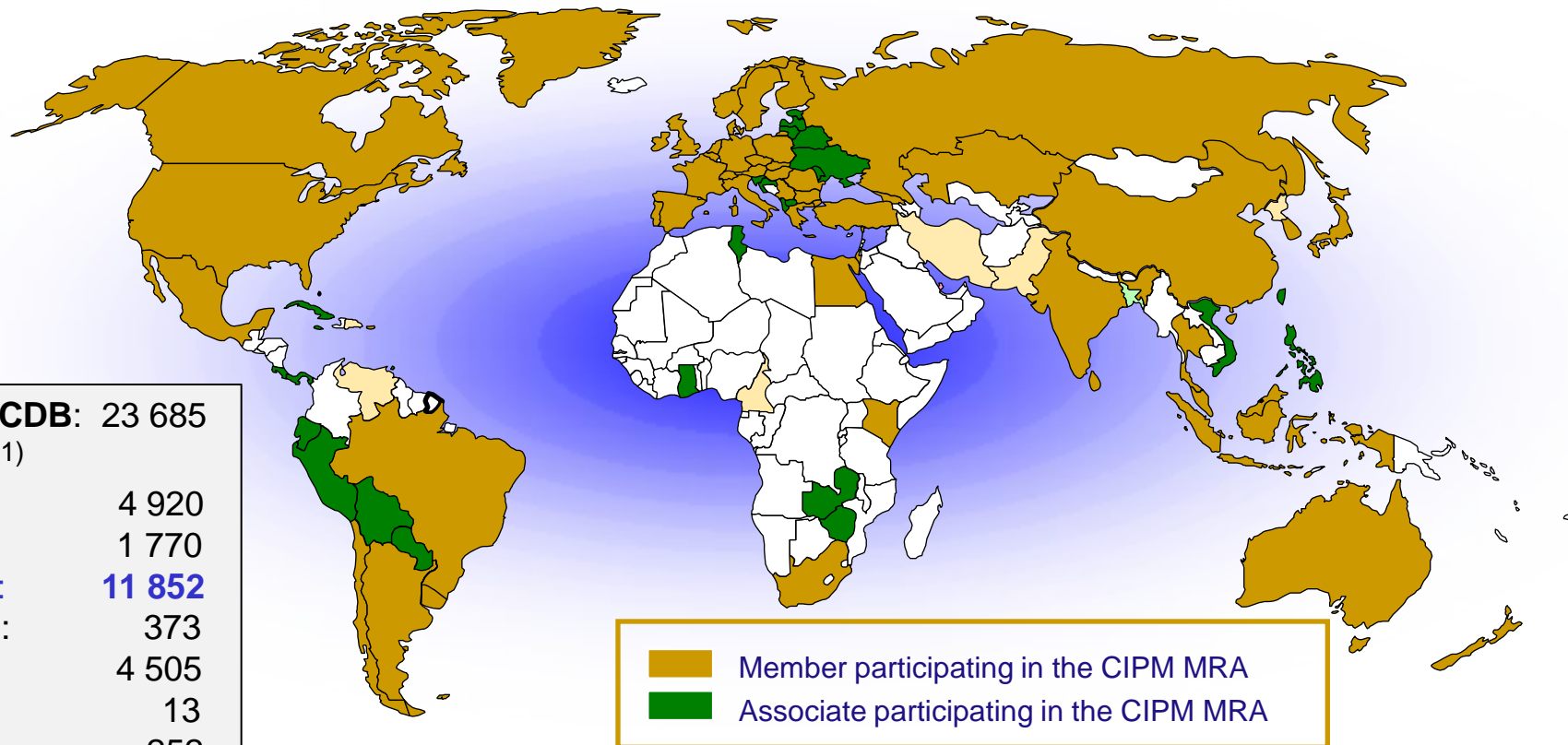
Role of RMOs within the Metre Convention



- ❑ **Joint Committee of the RMOs and the BIPM:**
 - meets 2 times per year
 - delegations of the RMOs
 - representatives of BIPM

- ❑ **JCRB is charged with (acc. to RoP):**
 - a) coordinating the activities among the RMOs in establishing confidence for the recognition of calibration and measurement certificates
 - b) making policy suggestions to the RMOs and to the CIPM on the operation of the MRA
 - c) analysing the application by each RMO of the criteria of the MRA
 - d) analysing and entering into the KCDB the CMC proposals of each RMO
 - e) facilitating appropriate inter-regional supplementary comparisons;
 - f) writing an annual report on the activities of the JCRB to CIPM and signatories of the MRA.

Participation in the CIPM MRA



CMCs in KCDB: 23 685
(01 March 2011)

APMP:	4 920
COOMET:	1 770
EURAMET:	11 852
AFRIMETS:	373
SIM:	4 505
IAEA:	13
IRMM:	252

**82 NMIs plus a further 135 DIs from
48 Member States**
31 Associates of the CGPM
3 international organizations

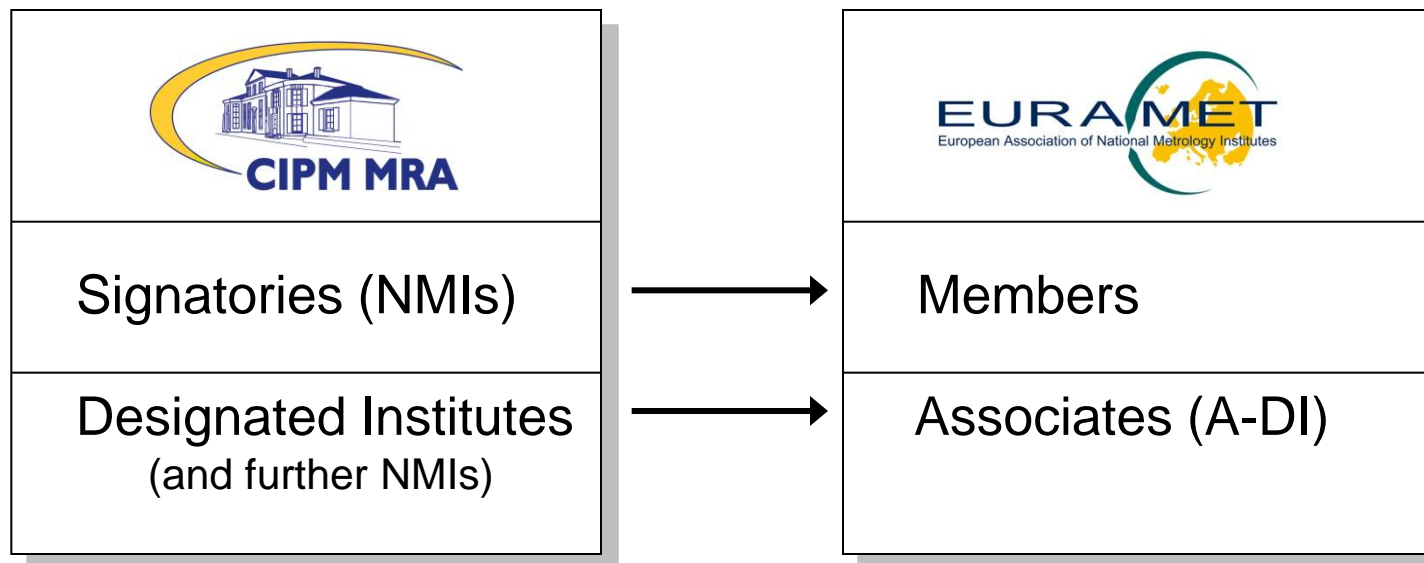
From EURAMET:

31 NMIs / 68 DIs

- 25 Member States
- 6 Associates
- 1 "Int. Organisation"

BIPM is working with several states
to become member or associate,
among others:

- Bosnia and Herzegovina
- Luxembourg
- Montenegro



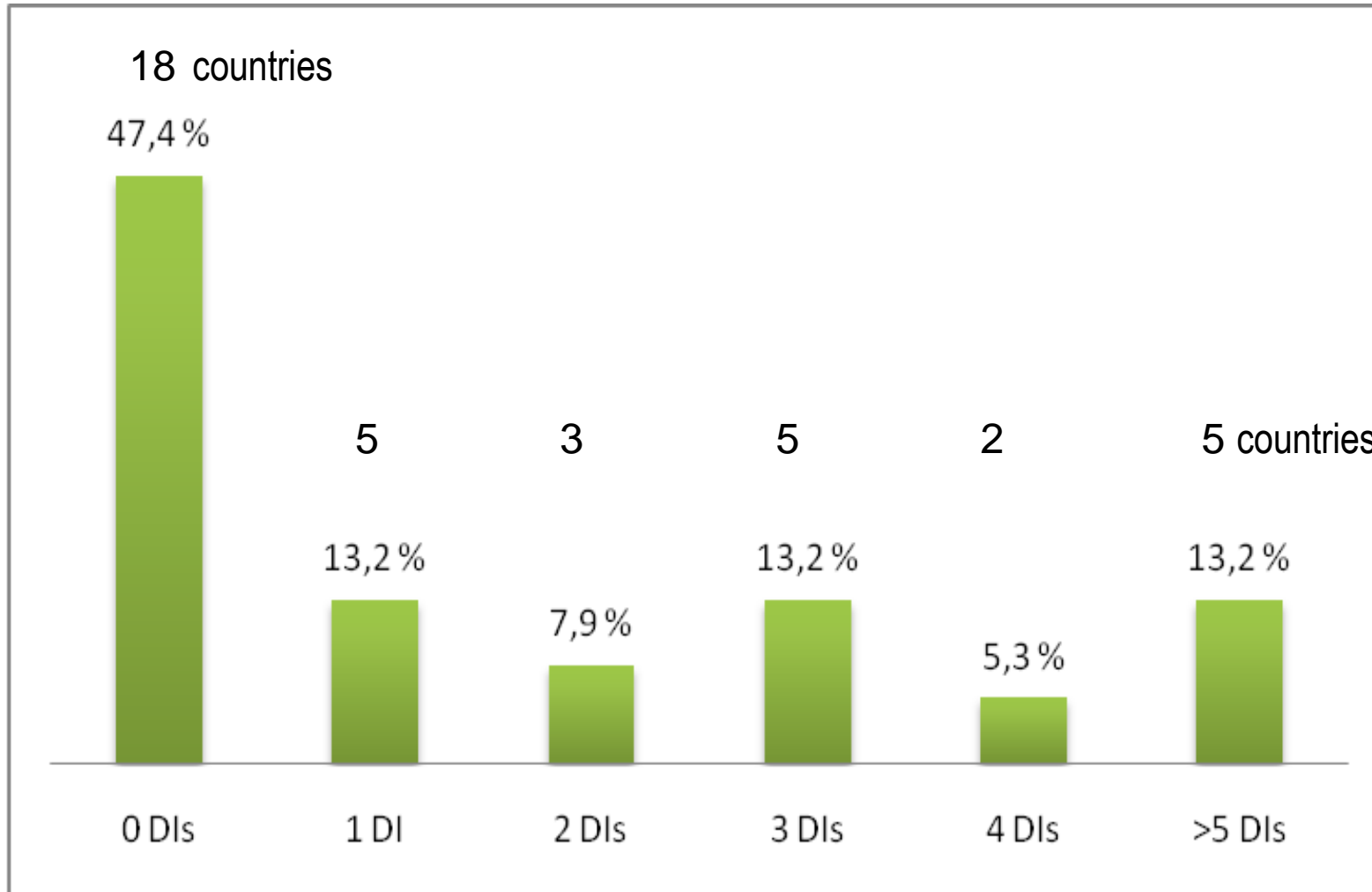
CIPM-MRA introduces the concept of “Designated Institutes” as responsible for national standards not covered by the “traditional” NMI

EURAMET requests a formal registration of a DI as Associate before carrying out the measures related to the CIPM MRA

- participation in EURAMET KCs and SCs
- review of the QMS by the EURAMET TC-Q
- review of the CMCs by the concerned EURAMET TC

Registration process of A-DI

Results: Number of DIs per country



Registration process of A-DI

Results: DIs per metrology area

Metrology Area	AUV	EM	F	IR	L	M	MC	PR	T	TF	Total
Number of DIs	2	7	8	16	8	10	18	4	10	6	89
having CMCs	2	7	6	13	6	8	8	4	9	6	69
	100%	100%	75%	81%	75%	80%	44%	100%	90%	100%	
having TC/SC-CP	2	5	6	16	3	5	6	2	6	4	55
	100%	71%	75%	100%	38%	50%	33%	50%	60%	67%	

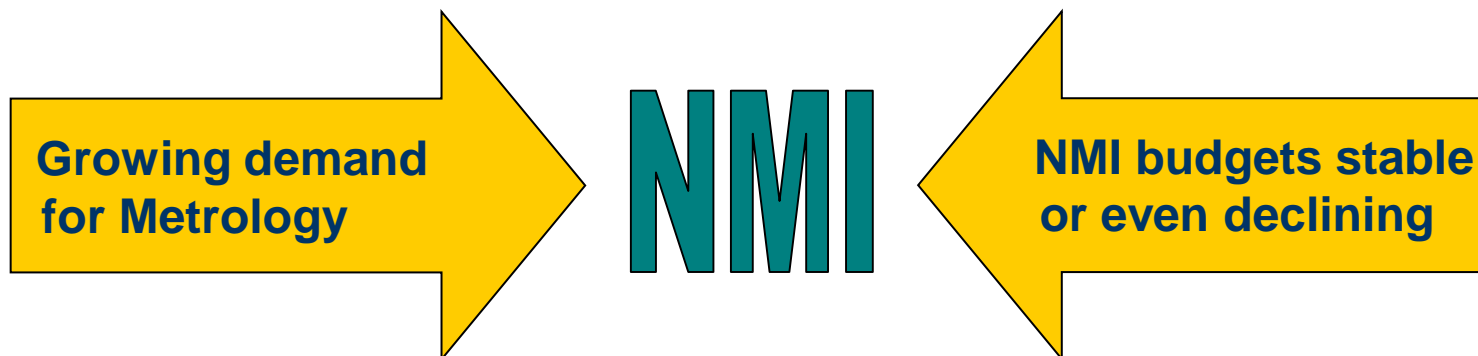
Note: DI's which are active in several metrology areas are registered for each of these fields
(therefore the total number is larger than 68)

- Highest number of DIs in Ionising Radiation (IR) and Chemistry (MC)
- Only 33% of the DIs in MC have CMCs:
 - many of them are new and just started with the CMC process
 - inter-regional CMC review in MC is complicate and takes much time

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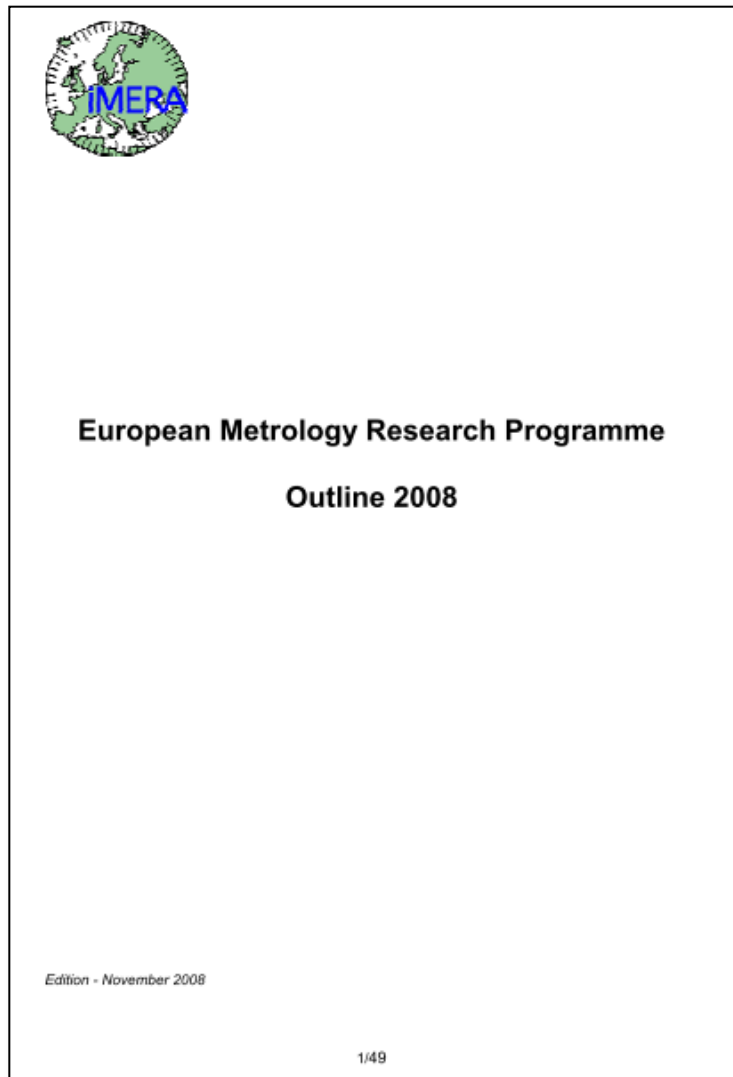
The “Metrology Dilemma”



- **Traditional areas of industry**
 - becoming more complex
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- **New areas of technology**
e.g. nano-technology or biotechnology
- **Areas in which metrology is increasingly recognised**
e.g. chemistry, clinical analysis, food safety

Pool resources and launch a joint metrology R&D programme that ...

- makes efficient use of the available resources through **coordination** and **collaboration**
- allows **larger scale** and/or **more challenging** projects to be supported
- addresses “**grand challenges**” and pools the traditional approach



Document available on: www.euramet.org

Grand Challenges

Health
Energy
Environment
New technologies
(nano-sciences, security, etc.)

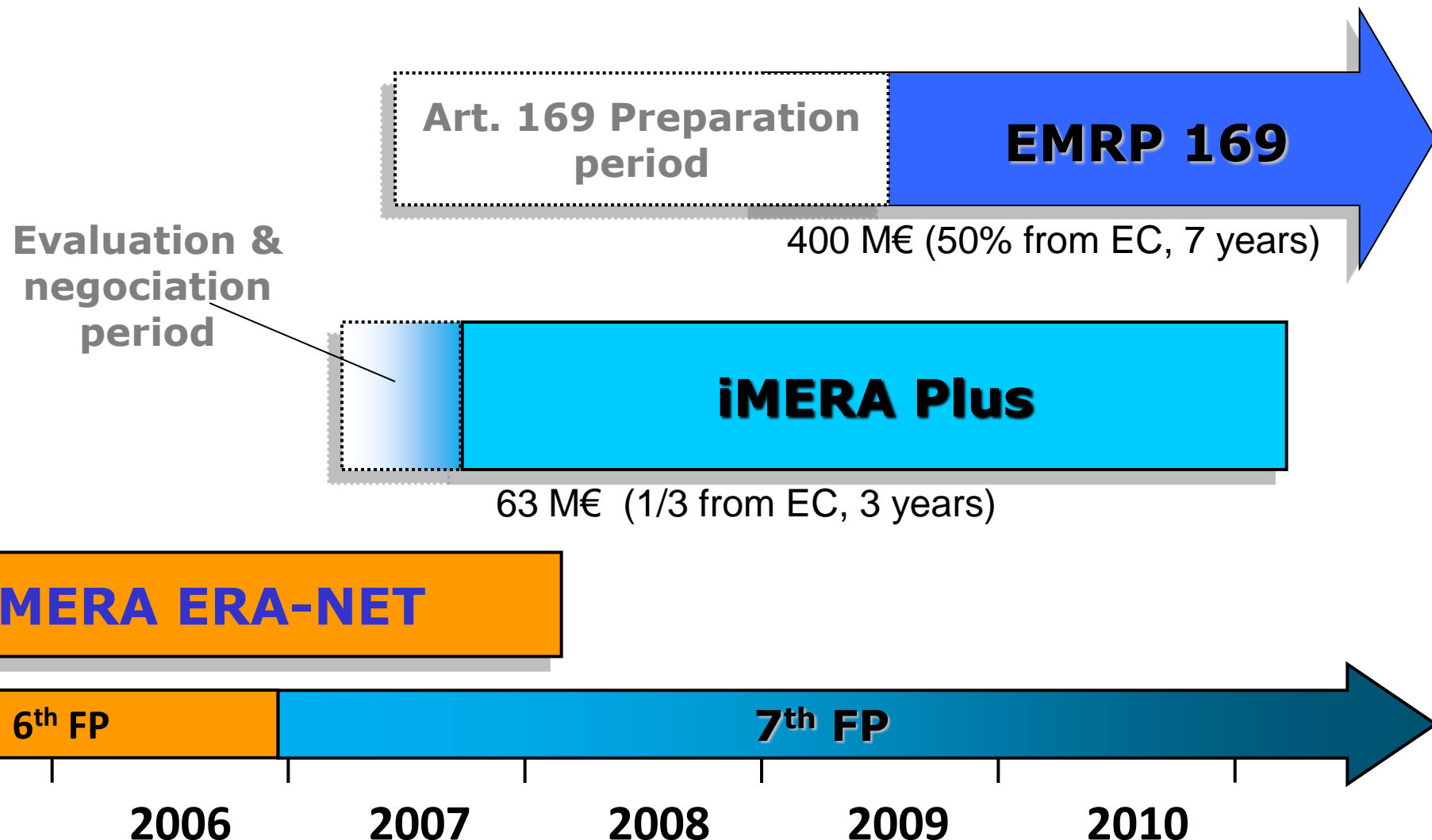
R&D for fundamental and applied metrology

Fundamental metrology
Focused single discipline
(including SI, Fundamental Constants, Biotechnology, Materials)

Capacity Building and KT



Timeline of the EMRP



Financing of the A-169 EMRP

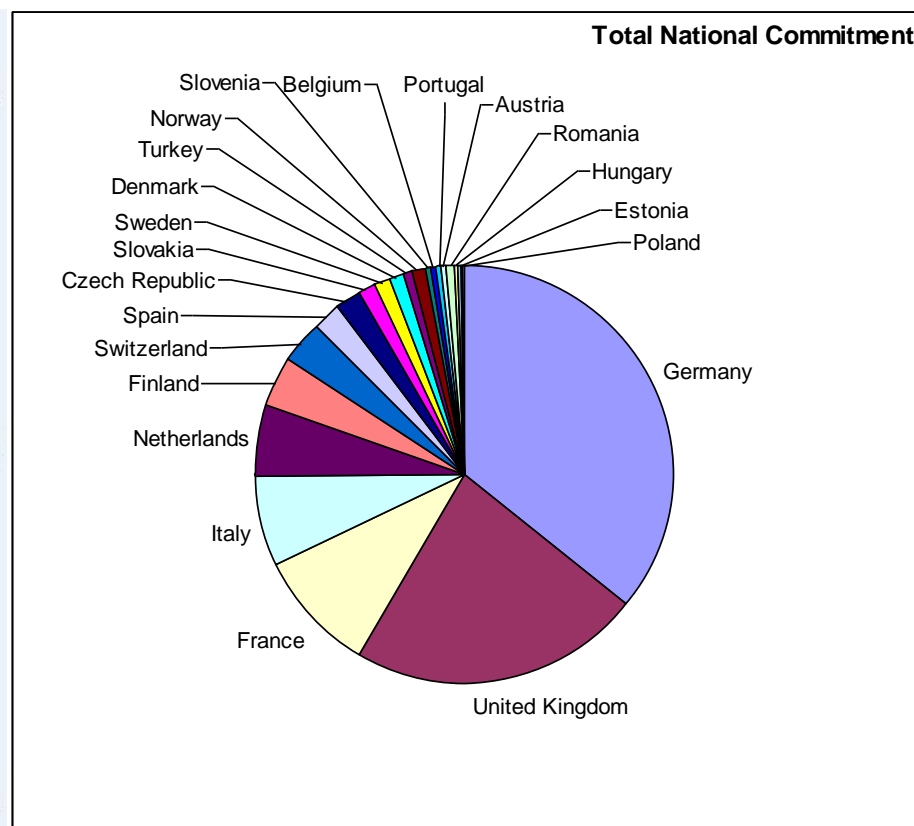


200 M€ from COM
(common pot)

200 M€ from participating countries
90% “in kind” + 10% cash (common pot)

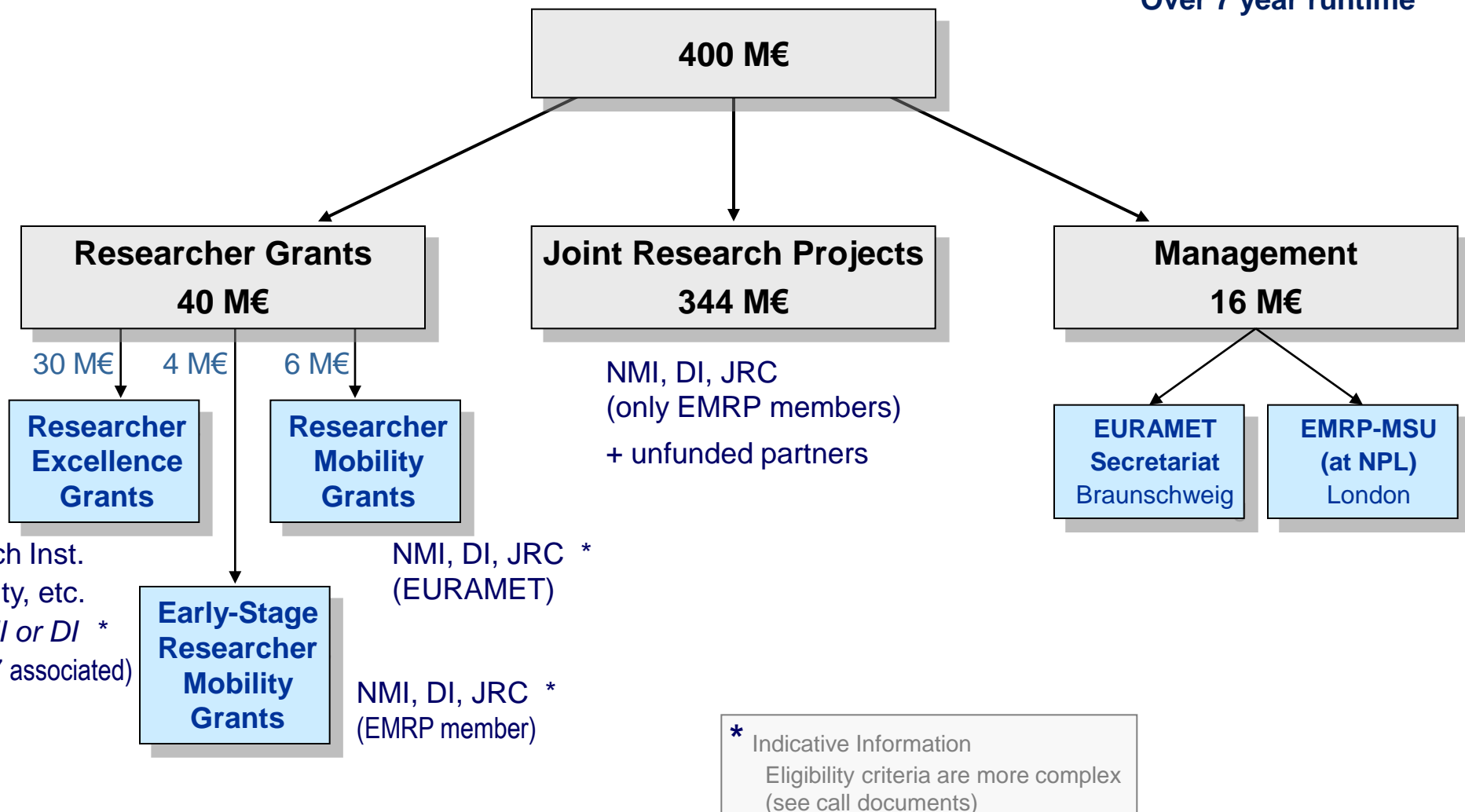


- Austria
- Belgium
- Czech Republic
- Denmark
- Estonia
- IRMM - European Commission
- Finland
- France
- Germany
- Hungary
- Italy
- The Netherlands
- Norway
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Spain
- Sweden
- Switzerland
- Turkey
- United Kingdom



Use of resources of the A-169 EMRP

Over 7 year runtime



EMRP Calls: iMERA-Plus & A-169

iMERA-plus 2007 call	total budget 63 M€
SI fundamentals	21
Health 1 st	21
Length	9
EM	12

project duration: 3 years
typical project size: 3 M€
typical # of partners:
7 (iMERA-plus)
13 (TP energy)

A169	Targeted Programme (TP)	total budget 400 M€
2009	Energy (1 st)	34
2010	Environment (1 st)	48
	Metrology for Industry (1 st)	48
2011	Health (2 nd)	30
	SI broader scope (1 st)	30
	New Technologies	30
2012	Metrology for Industry (2 nd)	40
	SI broader scope (2 nd)	40
	Open excellence call	10
2013	Energy (2 nd)	55
	Environment (2 nd)	35

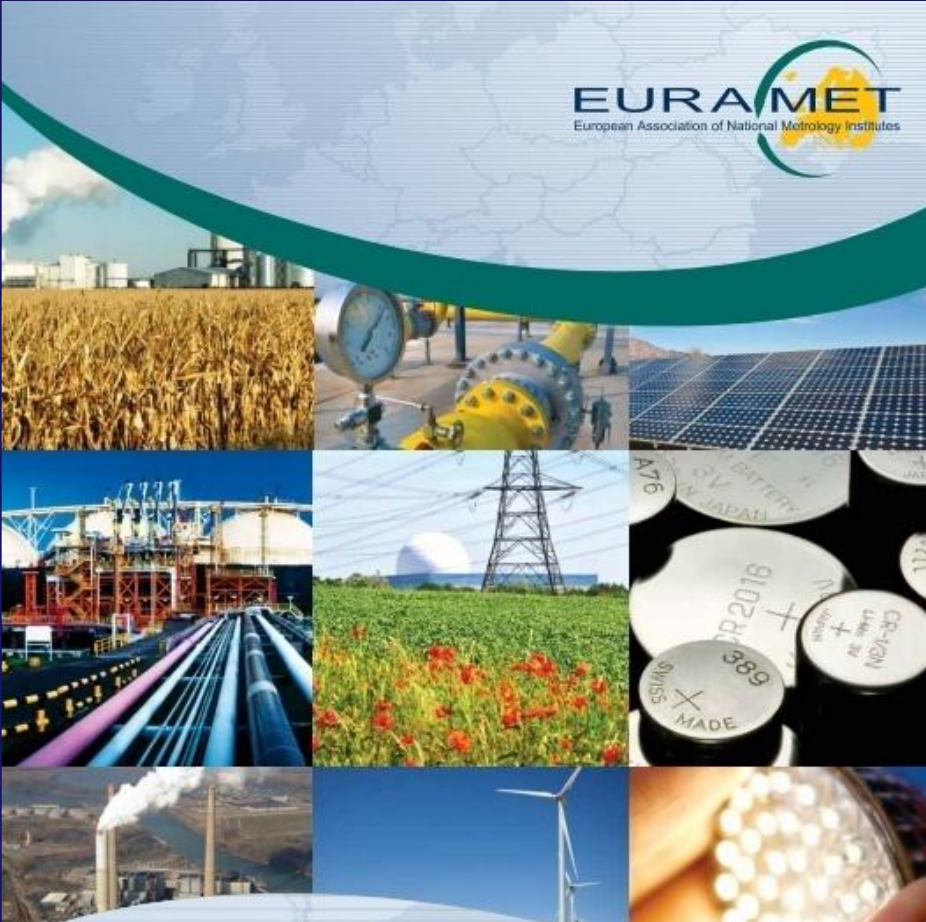
A-169 Call 2009: Energy

Project	Coordinator
Characterization of energy gases	NPL (UK)
Energy harvesting	PTB (DE)
Liquefied Natural Gas	VSL (NL)
Smart electrical grids	VSL (NL)
Solid-state lighting	VSL (NL)
Improved power plant efficiency	PTB (DE)
High-voltage DC	SP (SE)
New generation of nuclear power plants	NPL (UK)
Biofuels	LNE (FR)

Project runtime: mid 2010 to 2013

Information on projects on EURAMET website

<http://www.euramet.org/index.php?id=emrp>



EURAMET
European Association of National Metrology Institutes

European Metrology Research Programme

Sustainable Energy

An overview of the first funded projects, from the Targeted Programme Energy.
The aim of these projects is to help establish a sustainable European energy system through measurement research.
Focus is placed on technologies that enable greatly reduced greenhouse gas emissions, whilst also ensuring the security of Europe's energy supply.

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Large NMI

PTB, Germany: > 1900 employees

Focus on R&D

Participation in EMRP

Long experience in metrology

PTB, NPL more than 100 years

Centralised system (only the NMI)

Netherlands: VSL
Bulgaria: BIM-NCM

Small NMI

MNS-NMS, Malta: 4 employees

Focus on services

Develop capabilities for calibrations and KT

In process of establishment

Cyprus, Luxembourg, ...

Network of laboratories

France: LNE + 9 DIs
Slovenia: MIRS + 9 DIs

Challenge for EURAMET:

- Provide a forum for an effective participation of all Members
- Support emerging members in the establishment of an appropriate metrology infrastructure

TC-IM Focus Group on Facilitating National Metrology Infrastructure Development



Joint Focus Group WELMEC – EURAMET



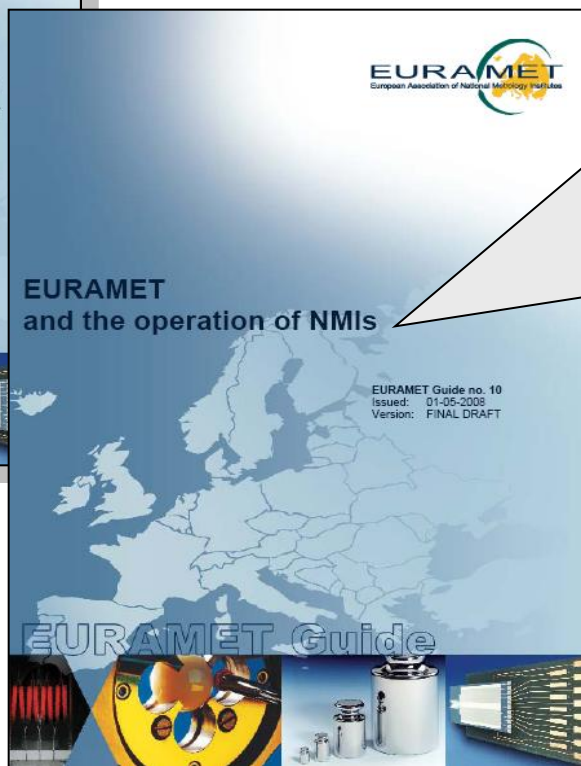
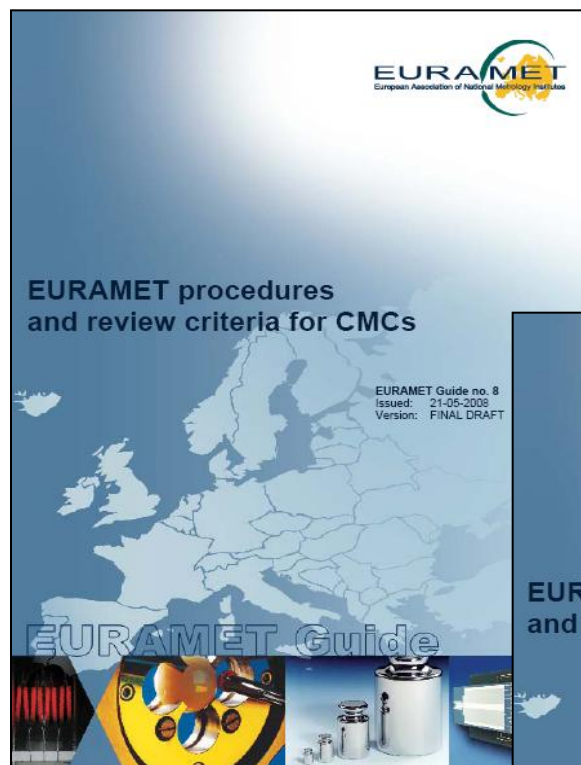
Goals of the Focus Group:

- promotion and development of the metrology infrastructure by **increased cooperation**
- facilitation and acceleration of the **integration**
of its member NMIs **into EURAMET activities**
and of WELMEC Associates into **WELMEC activities**
- **raising awareness** about the development in metrology and quality infrastructure

... oriented to “emerging” members

- **Training Courses**
- **Inter-Comparisons**
- **Elaboration of guidance documents and training material**
- **Awareness Raising and Joint Networking**
- **Peer Visits on Quality Management Systems**
- **Coordination of Metrology Services**

Development of Guidance Documents



This document has been prepared by EURAMET as a [guide to the operation of National Metrology Institutes](#) (NMIs). It aims to provide information for the top level management of a NMI and those persons who are responsible in the respective ministry for the national metrological infrastructure.

Depending on the size of a country and the specific metrological needs of industry, society and the scientific community, the scope of a NMI will vary, but [key elements for the structure and the operation can be identified](#). The information contained in this guide reflects the experience of larger and smaller European NMIs obtained over recent years and reflects the growing need for European and international cooperation.

**Available
on website**

Development of Guidance Documents

Guidelines on the determination of uncertainty in gravimetric volume calibration

EURAMET/cg-19/v.01

September 2009

Calibration Guide

N°	Calibration Guides	TC
01	<u>Calibration of Stylus Instruments for Measuring Surface Roughness *</u>	L
02	<u>Calibration of Gauge Block Comparators</u>	L
03	<u>Calibration of Pressure Balances *</u>	M
04	<u>Uncertainty of Calibration Results in Force measurements</u>	M
05	<u>Co-ordinate Measuring Machine Calibration **</u>	L
06	<u>Extent of Calibration for Cylindrical Diameter Standards</u>	L
07	<u>Calibration of Oscilloscopes *</u>	EM
08	<u>Calibration of Thermocouples</u>	T
09	<u>Measurement and Generation of Small AC Voltages with Inductive Voltage Dividers</u>	EM
10	<u>Determination of Pitch Diameter of Parallel Thread Gauges by Mechanical Probing</u>	L
11	<u>Guidelines on the Calibration of Temperature Indicators and Simulators by Electrical Simulation and Measurement</u>	T
12	<u>Guidelines on the Evaluation of Vector Network Analysers (VNA)</u>	EM
13	<u>Guidelines on the Calibration of Temperature Block Calibrators</u>	T
14	<u>Guidelines on the Calibration of Static Torque Measuring Devices</u>	M
15	<u>Guidelines on the Calibration of Digital Multimeters</u>	EM
16	<u>Guidelines on the Estimation of Uncertainty in Hardness Measurements</u>	M
17	<u>Guidelines on the Calibration of Electromechanical Manometers</u>	M
18	<u>Guidelines on the Calibration of Non-Automatic Weighing Instruments</u>	M
19	<u>Guidelines the Determination of Uncertainty in Gravimetric Volume Calibration</u>	F
20	<u>Calibration of Climatic Chambers, Requirements for the Accreditation of Calibration Laboratories</u>	T

THANK YOU FOR YOUR ATTENTION

**Wolfgang Schmid,
Head of EURAMET Secretariat**

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<http://www.euramet.org>