The OIML

in the World Economy

J.F. Magaña
BIML Director

The United Nations have 192 Member States

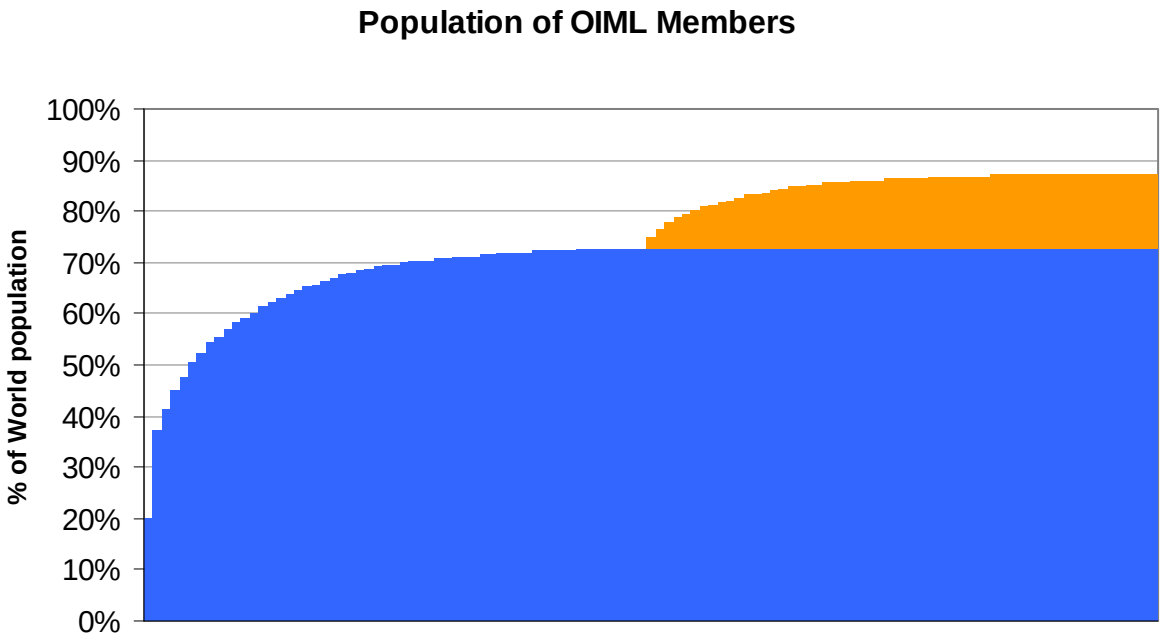
WTO has 153 Members

ISO has 162 Members

OIML has only 57 Member States,

BUT we are highly representative

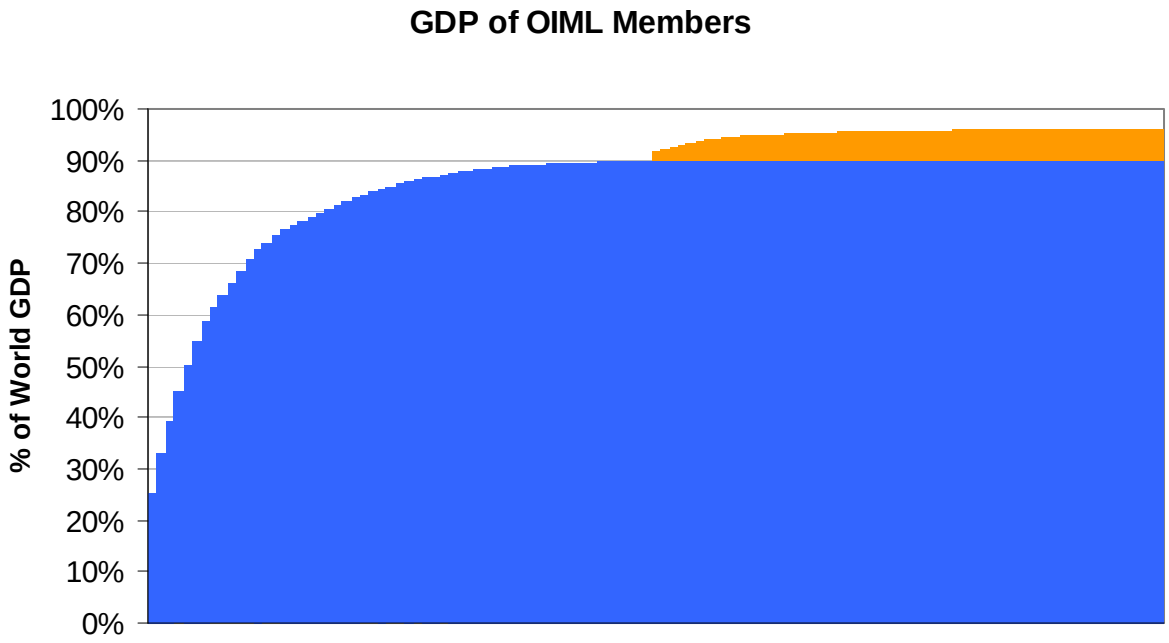
Who are we ?



OIML Member States are
4.8 billion inhabitants
73 % of the World population

Corresponding Members are
1 billion inhabitants
15 % of the World population

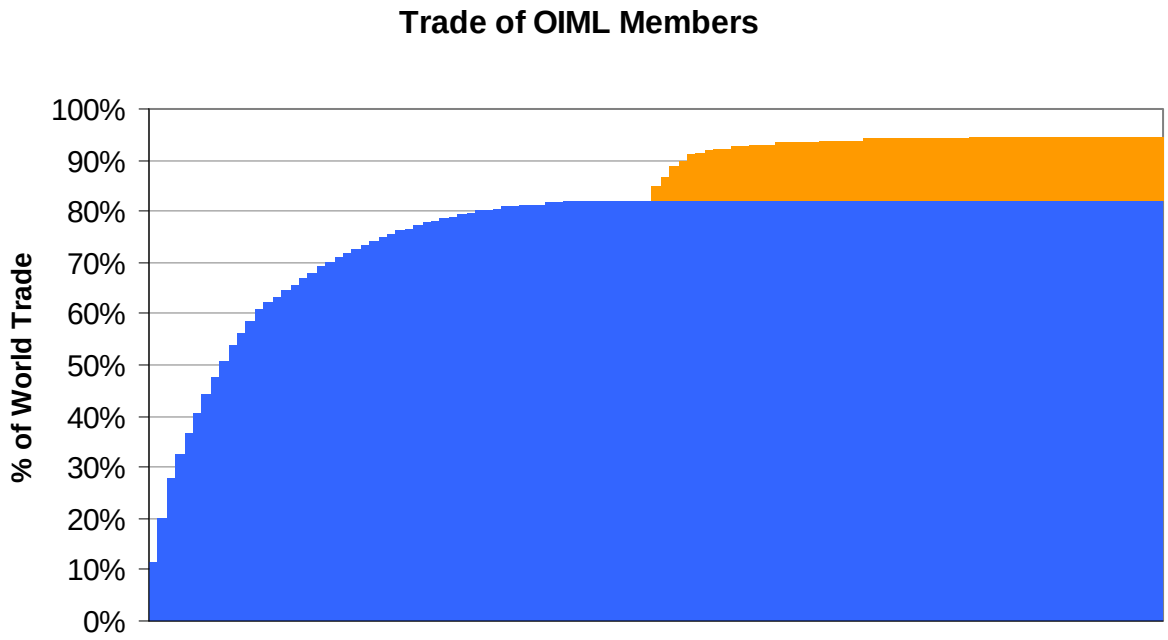
Who are we ?



OIML Member States represent
49 trillion USD of GDP
90 % of the World GDP

Corresponding Members represent
3.2 trillion USD of GDP
6 % of the World GDP

Who are we ?



OIML Member States represent
23 trillion USD of trade
82 % of the World trade

Corresponding Members represent
3.4 trillion USD of trade
12 % of the World trade

Our activity

OIML publications:

- 102 Recommendations (one or several parts)
  (112 categories of instruments)
- 28 Documents
- 16 Guides

OIML Technical Committees:

- 65 active committees
- 122 work projects

OIML Certificate System:

- 53 categories
- 2130 Certificates
  - in 16 categories
  - for 465 manufacturers
  - from 38 countries

The inquiry

on the implementation

of OIML Recommendations

This inquiry started early 2009, in the form of a **permanent on line database**

It provides **information** on the national regulations and their compatibility with the OIML

But it also gives very useful elements to analyze the **OIML priorities**.

Representativity of the answers

Up to now, it gathers only **24 answers** out of 57 Member States (none of the 58 Corresponding Members has replied yet).

The degree of completion of this inquiry represents:

- **23 %** of the total population of Member States
- **64 %** of the total GDP of Member States

Most regulated categories

More than 90 % of answers:

Fuel dispensers for motor vehicles	100,0%
Measuring systems on road tankers	100,0%
Active electrical energy meters for direct connection	100,0%
Non automatic weighing instruments	100,0%
Gas volume meters	95,8%
Water meters	91,7%
Taximeters	91,7%
LPG road dispensers	91,7%
Automatic rail weighbridges	91,3%
Weights	91,3%
Continuous totalizing automatic weighing instruments	91,3%

Most regulated categories

More than 90 % of population:

Fuel dispensers for motor vehicles	100,0%
Measuring systems on road tankers	100,0%
Active electrical energy meters for direct connection	100,0%
Non automatic weighing instruments	100,0%
Gas volume meters	99,6%
Taximeters	99,0%
Weights	98,2%
Water meters	95,9%
LPG road dispensers	94,6%
Exhaust gas analysers	93,2%
Road and Rail tankers	93,2%
Labelling of prepackages	91,2%
Measuring systems for unloading ships, rail and road tankers	90,5%

Most regulated categories

More than 90 % of GDP:

Fuel dispensers for motor vehicles	100,0%
Measuring systems on road tankers	100,0%
Active electrical energy meters for direct connection	100,0%
Non automatic weighing instruments	100,0%
Gas volume meters	99,0%
Taximeters	97,7%
Weights	96,7%
Water meters	94,1%
Exhaust gas analysers	94,0%
LPG road dispensers	91,9%

To which extent

do we answer the needs ?

Most accepted OIML references

OIML requirements fully satisfying national regulations:

Category	Reg.	Accept.
Non automatic weighing instruments	23	17
Fuel dispensers for motor vehicles	24	16
Water meters	22	14
Road and Rail tankers	21	14
Weights	21	13
Capacity serving measures	16	13
LPG road dispensers	22	13
Measuring systems on road tankers	24	13
Gas volume meters	23	13
Heat meters	17	12
Measuring systems for unloading ships' tanks and rail and road tankers	21	12

Less accepted OIML references

OIML requirements not accepted for national regulations:

Category	Reg.	Not acc.
Active electrical energy meters for direct connection	24	11
Diaphragm gas meters	17	8
Sound level meters	13	8
Alcohometers and alcohol hydrometers and thermometers for use in alcohometry	15	7
Gas volume meters	23	6
Net content of prepackages	19	6
Taximeters	22	6
Standard weights for testing of high capacity weighing machines	12	6
Speedometers, mechanical odometers and chronotachographs for motor vehicles	13	6

Additional requirements

Additional requirements to OIML requirements:

Category	Reg.	Add.
Taximeters	22	8
Active electrical energy meters for direct connection	24	6
Continuous totalizing automatic weighing instruments	21	6
Measuring systems for the refuelling of aircrafts	19	5
Blend dispensers	18	5
Water meters	22	5
Automatic gravimetric filling instruments	18	5
Measuring systems on road tankers	24	4
LPG road dispensers	22	4
Measuring systems for unloading ships' tanks and rail and road tankers	21	4

.../...

Additional requirements

Additional requirements to OIML requirements:

Category	Reg.	Add.
Tyre pressure gauges used in service stations for inflating tyres	12	4
Measuring systems for milk, beer and other foaming potable liquids	20	4
Measuring systems for liquefied gases under pressure other than LPG	19	4
Measuring systems for loading ships	19	4
Fuel dispensers for motor vehicles	24	4
Automatic rail weighbridges	21	4
Automatic catchweighing instruments	19	4
Measuring systems on pipelines	16	4
Discontinuous totalizing automatic weighing instruments	19	4

Comments

on these results

We need to have more answers from Member States to this inquiry.

We should also have answers from Corresponding Members.

Some recent versions of publications are not always taken into account.

There is a strong need on

Utilities

- electricity
- gas
- water

Measurement of oil products for delivery

- road tankers (static and dynamic)
- LPG

Some automatic weighing instruments

- rail weighbridges
- belt weighers

Some categories show paradoxal situations

Gas volume meters are a category for which OIML requirements gather:

- one of the most numerous **full acceptance**
- one of the most numerous **rejection**

The balance is favourable (13 pros, 6 cons), but it shows that Member States are not always ready for an easy consensus

This is symptomatic of a lack of mutual confidence

Countries who reject OIML references consider that they had been approved by non competent enough or non experienced enough colleagues,

Countries who accept OIML references consider that they are rejected because other colleagues do not want to change their habits.

We must all be persuaded that:

- The technologies are worldwide spread and the technical issues to face are the same in all countries
- Our colleagues have similar competence and experience as we have,
- Our colleagues have the same objectives: reliable measurements, fair trade and protection of consumers,
- What is considered acceptable in other countries should be duly considered in our country.

Actions to take

Review the publications in the light of this inquiry:

- analyse the reasons of non acceptance of the existing publications,
- analyse the national additional requirements

Revise the publications, as necessary, with a view to getting better acceptance

Complete them as necessary, to include them in the Certificate System

Expected participation

of Member States

Activity needed from OIML Member States

CIML Meetings: 1 150 days

- 3 weeks preparation
- 1 week meeting
- 57 CIML Members

TCs/SCs: 3 200 days

- 16 drafts per year
- 30 days of Secretariat work
- 10 days of work per p-member
- average 17 p-members

Average: 76 days per Member State

Resources for OIML work

Total: about 6 800 days

- BIML, 11 staff members: 2 420 days
- Member States work: 4 350 days

Cost of the BIML: 1780 k€

- 31 k€ per Member State
- 0.37 € per thousand inhabitants
- 0.05 ppm of MS GDP

Need of average national resources for MS work:

- 56 k€ per Member State
- 0.67 € per thousand inhabitants
- 0.1 ppm of MS GDP

OIML Seminar
Stakes and priorities of legal metrology for trade
Mombasa 26 October 2009

Legal Metrology's contribution to Trade Liberalisation And Public Policy

John Birch AM, Hon Member CIML

1.Summary

The development of national and global metrology systems to ensure the consistency of measurements will be considered and the role of these systems combined with mutual acceptance arrangements in facilitating trade will be discussed. With the increasing use of measurements in government regulation and public policy issues there is a need for metrological principles to be applied to these measurements to provide trust and confidence and ensure community disputation does not impede policy implementation.

2. Introduction

Over the last 5000 years most civilisations developed metrology systems to ensure the consistency of measurements over a wide range of domestic and military activities. From the late 19th century in response to increased globalisation a global metrology system was established to provide consistency of measurements between national measurement systems.

The 1875 Treaty of the Metre provided for consistency between national standards and the 1955 Treaty on Legal Metrology provided for the international certification of measuring instruments. Combined with well defined physical quantities and legal units of measurement and the development of accreditation there were all the elements needed for global recognition of measurements.

However the 20th century has seen a massive increase in the use of measurement not only in industry and commerce but also in government regulation and many of these measurements are not subject to metrological control. This problem was well expressed by Hunter in a 1980 paper (1)

> the quantity of the scientific measurements now required by our measurement-intensive laws and regulations are piling up, while many of the desirable physical and statistical characteristics of good measurement methods and associated measurement systems are being given short shrift…. The result is that the quality of many scientific measurements is suspect.

This problem has become even more critical with the increasing importance of measurements in determining government policy.

3. Trade Liberalisation

It is particularly appropriate for OIML to have organised a seminar on trade facilitation at this meeting in Mombasa. Since 2001 the WTO DOHA Development Round has sought to rebalance trade rules in favour of developing countries by cutting tariffs and farm subsidies. The OECD has estimated (2) at nearly $100 billion the gains that could be achieved from full tariff liberalisation for industrial and agricultural goods. However negotiations have been plagued by disagreements between developed and developing countries, with many developing countries believing they would be disadvantaged by the WTO rules.

Whilst international trade can be a major engine of growth for national economies, the 2008 report of the Commission on Growth and Development (3) found that few developing countries had been able to achieve sustained growth and that growth paths were country specific. An influential study in 2005(4) also found that market access by itself would not guarantee growth and if introduced before the development of strong domestic markets could be detrimental. Indeed growth in some countries eg Mexico had declined after being given preferential access to markets.

4. Economic Liberalism

Since the 1980's Economic Liberalism has dominated the policy agenda of governments with an emphasis on market-based reforms, deregulation of large sectors of the economy and privatisation of many government services. Metrology has not been immune to these policies with many traditional functions of trade measurement being privatised, requirements deleted and in some countries National Measurement Institutes privatised.

However too often the financial benefits of this market based approach were at the expense of environmental sustainability and a reduction in trust and social capital. The current Global Financial Crisis is leading to a re evaluation of the limits of market based policies and calls for greater regulation.

5 Metrology as a System

Whilst economic liberals have portrayed metrology as regulatory a more accurate description would be facilitator. Metrology systems have been developed to ensure the consistency of measurements and the community's trust in these systems significantly reduces transaction costs. This is of particular importance to developing countries. Kenneth Arrow the Nobel Economic Laureate said

> Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence (5)

6.Global Trade Metrology

OIML through the development of International Recommendations, international certification of measuring instruments and the Mutual Acceptance Arrangement (MAA) for the certification of measuring instruments has been methodically establishing at an international level the trust that exists in well established national metrology systems. As well as facilitating the trade in measuring instruments, which has been estimated as Eu 30 billion. these arrangements also provide developing countries with trust in the integrity of measuring equipment used in their national systems. This trust would be greatly enhanced by the introduction of a compliance system within the MAA.

For developing countries particularly in Africa the challenge for their economic development is to obtain access to the markets of the developed world. For many countries their principal exports are bulk commodities, minerals and energy, which are often developed by multinational companies with limited benefit remaining in the country of origin.

Changes in food production and distribution are creating opportunities for developing countries to add value to their exports through export of pre-packaged commodities. Internationally the trade in processed food and beverages is increasing twice as fast as the trade in primary commodities and in 2002 was estimated at $US 900 billion (6) and accounted for 75% of global agric food trade (7)

Developing countries are also benefiting from the increased trade in high value food products with fresh and processed fruit and vegetables, fish meat nuts and spices accounting for more than 50% of agric food exports of developing countries. Developing countries should also benefit from increased demand for tropical fruits and vegetables, spices and nuts and for organic food. Pre packing such products can markedly increase their value. It is of interest in this regard that tea, which has been the principal export of Kenya, has now been overtaken by fresh flowers. Whilst flowers are not a measured product this does highlight the importance of high value products.

However a major impediment for developing countries is the cost of complying with diverse requirements .An OIML MAA for pre packaged goods could reduce multiple testing of products, speed up entry of goods across borders, provide a level playing field for global commerce, reduce compliance costs, enhance consumer protection and reduce fraud. In addition as indicated by a KPMG study (8) conducted for the CIPM international MAAs are far more cost effective than multiple bilateral or regional arrangements.

7. Legal Metrology

Since 1950 measurements have been increasingly used in government regulation as they have advantages of objectivity and cost effective compliance over alternative methods. However in many cases the effectiveness of the regulation has been limited by the absence of a metrological system for the measurements resulting in reduced trust and confidence in the measurement and increased litigation.

OIML, by developing International Recommendations for a wide range of environmental, safety, health and medical measuring instruments, has provided the essential element for metrology systems for these measurements. Despite this many government administrators have been reluctant to introduce metrology principles into their regulations.

An example of this difficulty was the introduction in Australia from 1970 of speed measurement and alcohol testing instruments for road safety control. Whilst they proved to be very effective in reducing the road fatalities there was constant litigation over the measurements, which reduced community confidence and created political difficulties. Discussions between the Australian police forces and Australian metrology officials resulted in the certification of the traceability of breathalysers in accordance with OIML Recommendations and the development of a metrological control system for these measurements. This highlighted the important role of national metrological organisations in co-ordinating, through their National Measurement legislation, the national metrological system.

When I first spoke in 1998 on role of legal metrology in road safety(9) I believed it was primarily an issue for developed countries. However over the last decade a number of reports by WHO and the World Bank have highlighted the importance of this issue for developing countries. It is now estimated (10) that unless action is taken, by 2030 road deaths could become the fourth leading cause of death in developing countries. Children 5 to 14 are most at risk with road accidents projected to be the leading cause of death for that group by 2015.The World Bank is currently supporting a project on this issue in Vietnam where road accidents were costing the country 5% of GDP.

Most countries when addressing this issue of road safety are faced with two policy options. A civil engineering option of massive expenditure on road construction to limit road accidents or the social engineering option of changing the behaviour of drivers. Legal metrology can make a significant contribution to this latter option which is highly cost effective. However politically, spending money on road construction is electorally popular, due to local job creation, whereas the social engineering option generates community opposition to changing driving behaviour.
For the legal metrology options to be adopted there needs to be high trust and confidence in the measurements.

8. Metrology of Climate Change

The principal public policy issue facing governments around the world is climate change and whilst politicians see this as not only science based, but also a measurement based issue, metrologists have been only marginally involved in the development of public policy on the issue.

This was highlighted in Australia in November last year when the Prime Minister in launching the Governments policy on Carbon Pollution Reduction was asked if the IPCC were to review its temperature estimates, would the government review its targets. The Prime Minister replied

> Our job is to respond to what global science says to us...
> The IPCC scientists come to meetings and deliver the science.
> They're in the measurement game and they're out
> there to give us the bad news and the worst news. We are
> required to respond to the data as given.

Over the last ten years the General Conference of Weights and Measures has taken an interest in this issue. At the 21st CGPM meeting in 1999 a resolution was adopted which noted that the policies of governments are influenced by studies depending critically on accurate and mutually compatible measurements and recommended that such measurements should be conducted in accordance with good metrological practice.

The issue was again discussed at the 23rd CGPM in 2007 and a resolution was adopted which stressed

> -the importance of basing long-term measurements which relate to climate change on the stable references of the International System of Units (SI),
>
> -welcomes the proposed BIPM/WMO international conference to address the increasing important role of metrology in studies on global climate change,
>
> -recommends relevant bodies to take steps to ensure that all measurements used to make observations which may be used for climate studies are made fully traceable to SI units,

Dr Barry Inglis Deputy Chair of CIPM reported on these resolutions at the OIML Conference in Sydney last year. Certainly the measurement of greatest interest is the annual global temperature, which is a composite of many thousands of temperatures taken around the globe and there has been some questioning about the fitness for purpose of these measurements and the equipment used. It is important that both CIPM and CIML provide advice to WMO and other active bodies on the appropriate metrological control system for these measurements

9.**Measurement in Economics**

Finally I would like to comment on the recently published Report of the Commission on the Measurement of Economic Performance and Social Progress (11). The Commission was established by the French President Nicholas Sarkozy in February 2008 to identify the limits of GDP as an indicator of Economic Performance and Social Progress. The Commission was Chaired by Professor Joseph Stiglitz assisted by Professor Amartya Sen, both Nobel Economic Laureates.The report was commissioned before the Global Financial Crisis but it and the climate change issue are dealt with in some detail. There are two issues dealt with in the report which are of interest to the metrology community

1. The difficulty of measuring the economic value of services and government activities and particularly incorporating improvements in quality in the economic value of the activity. Determining the economic and social value of metrological activities has been a significant problem and has probably resulted in underinvestment in this activity

2. The Report notes that it is about measurement rather than policies, and states that

> The decisions we make depend on what we measure, how good our measurements are and how well our measures are understood.

This has a certain resonance with the oft quoted remark of Lord Kelvin (12)

> When you can measure what you are speaking about and express it in numbers, you know something about it, but when you cannot measure it, when you cannot express it in numbers your knowledge is of a meagre and unsatisfactory kind

The Report further states that the reason the Global Financial Crisis took many by surprise was that our economic measurement system failed, particularly due to the quantities being measured being ill defined and often composite of a number of quantities. Another eminent economist Robert M Solow in an article published in Science magazine in 1987 made a most apposite remark in this regard (13)

> Social sciences have “fuzzy edges” and in economics it is possible to keep a bad idea alive for 10 years on sheer ingenuity and “enlargement of observations”

Many of the problems identified in the report are familiar by analogy to metrologists and consideration should be given to greater interaction between metrologists and social scientists on developing systems to ensure consistency of measurements.

References

1. J S Hunter, The National System of Scientific Measurement , Science, 210, 869-673 November 1980

2.Angel Gurria, OECD, DOHA: the hanging fruit, 21 August 2006

3. Growth Commission 2008a, The Growth Report: strategies for sustained growth and inclusive development, World Bank, Washington

4 Nancy Birdsall, Dani Rodrick, Arvind Subramanian, How to help Poor Countries, Foreign Affairs , July/August 2005, 136-152

5. Kenneth Arrow, Gifts and Exchanges Philosophy & Public Affairs, Vol 1 No 4, 1972, 343-362

6. John Birch, The Economic Importance of Legal Metrology in pre-packaging, OIML Bulletin Vol XLVIII No 1 January 2007

7.World Bank: Impact of Food Safety and Agricultural Health Standards on Developing country Exports .2005

8. KPMG:Potential Impact of the CIPM Mutual Recognition Arrangement April 2002, 1-127

9. John Birch, The Role of Legal Metrology in Economic and Social Development, presented at Seminar on the Role of Metrology in Economic and Social Development, Brauschweig, Germany, 1998

10. World Bank'Road deaths predicted to rise in Developing Countries, News Release 14 January 2009

11.Joseph E Stiglitz, Amartya Sen, Jean-Paul Fitoussi, Report by the Commission on the Measurement of Economic Performance and Social Progress September 2009 1-292

12. Lord Kelvin, Popular Lectures and Addresses
Vol 1 p80 Macmillan 1891

13. Robert M. Solow, *Science* 6 November 1987

Why not use OIML and the International Recommendations in the Quality aspect in the global economy?

Håkan Källgren

Swedish Metrology and Quality AB (SMQ)

Background (from Sweden)

- Very limited legislation in Metrology
- Industries started to evaluate and develope solutions themselves

Swedish Metrology and Quality AB

The OIML Mission Statement

The mission of the OIML is to enable economies to put in place effective legal metrology infrastructures that are mutually compatible and internationally recognized, through harmonization and the establishment of mutual confidence

Swedish Metrology and Quality AB

Objective 3: *Facilitate domestic and international trade in measuring instruments, goods and commodities, etc.*

Swedish Metrology and Quality AB

OIML Recommendations

Very good !

- Performance requirements/classification
- Test procedures including field tests
- Influence factor tests, disturbance tests
- The differentiation of MPE in initial verification and in service

Not so good

- Too many technical requirements
- Missing real uncertainty evaluations

Swedish Metrology and Quality AB

Uncertainty in OIML recommendations

Example (R 106)

Verification standards.....

- A control instrument capable of.....The error of that instrument shall not be greater than one-third of the maximum permissible error for in-motion weighing.....

Should be:

The measurement process in determining the values of the reference wagons (up to the point and time they are used) should have an uncertainty of maximum one-third of the maximum permissible error for in motion weighing (95% confidence level)

Swedish Metrology and Quality AB

Otherwise problems related to accreditation bodies and uncertainty evaluation in production processes

An example of today's measurements in weighing without understanding of quality

Uncertainty in measurement (weighing)

3 years later
OIML R 51 TAC approval >1000 e

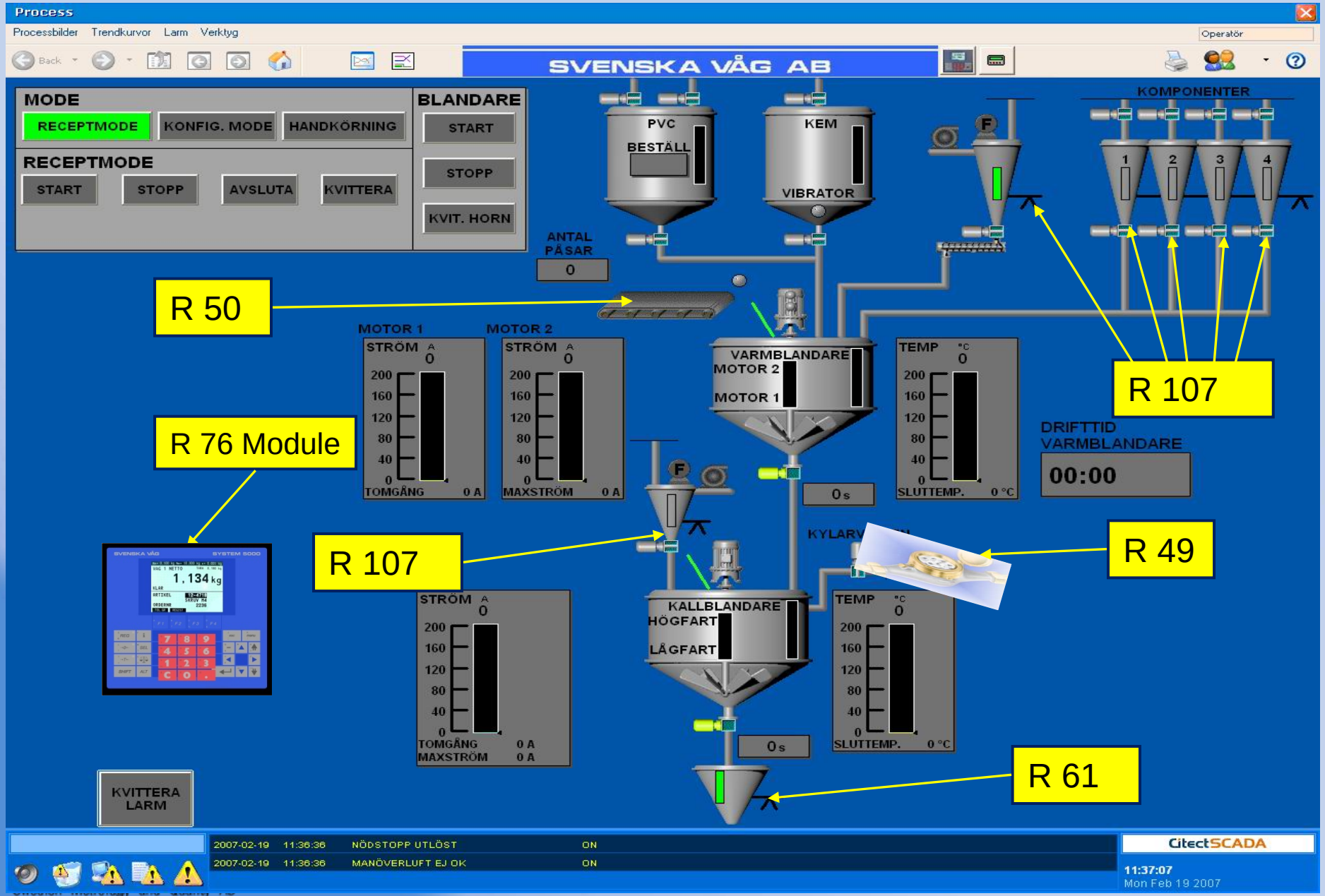
Expected
2 %

?

Measured
15 %

Weighing instrument

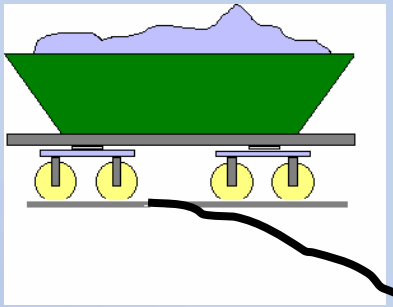
Receipt production/measurement

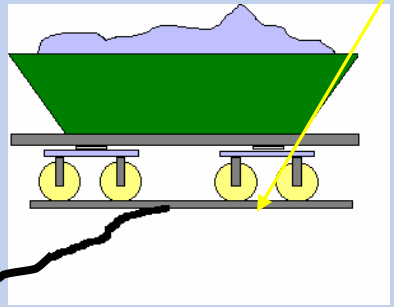


An example of heavy transport

R 50 class 1

R 106 class 1





Indicated load on an ore train

50 wagons

(From Peter Lau, SP)

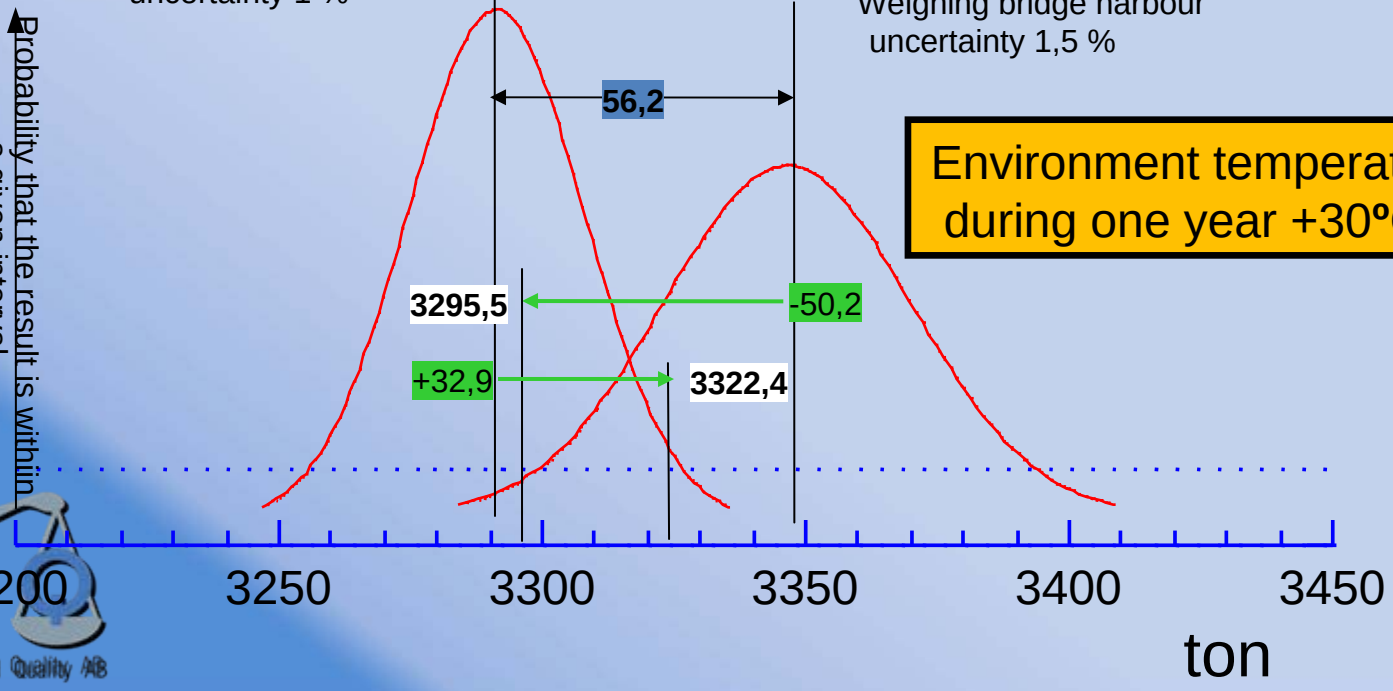
Beltweigher Mine
uncertainty 1 %

3289,5

3345,7

Weighing bridge harbour
uncertainty 1,5 %

Environment temperature
during one year +30ºC to -40ºC



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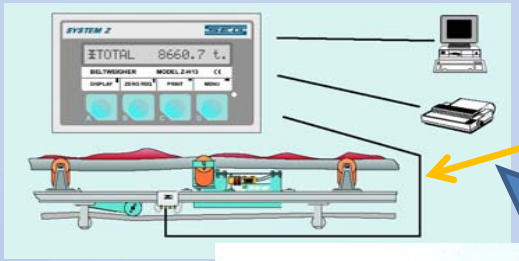
Total logistics: Project- transport of > 43 million ton/year



R 50

R 50

R 51

Number of belt scales: > 140

R 76

R 106

Wagon weight: 120 ton

R 50

Capacity: 12 000 t/h

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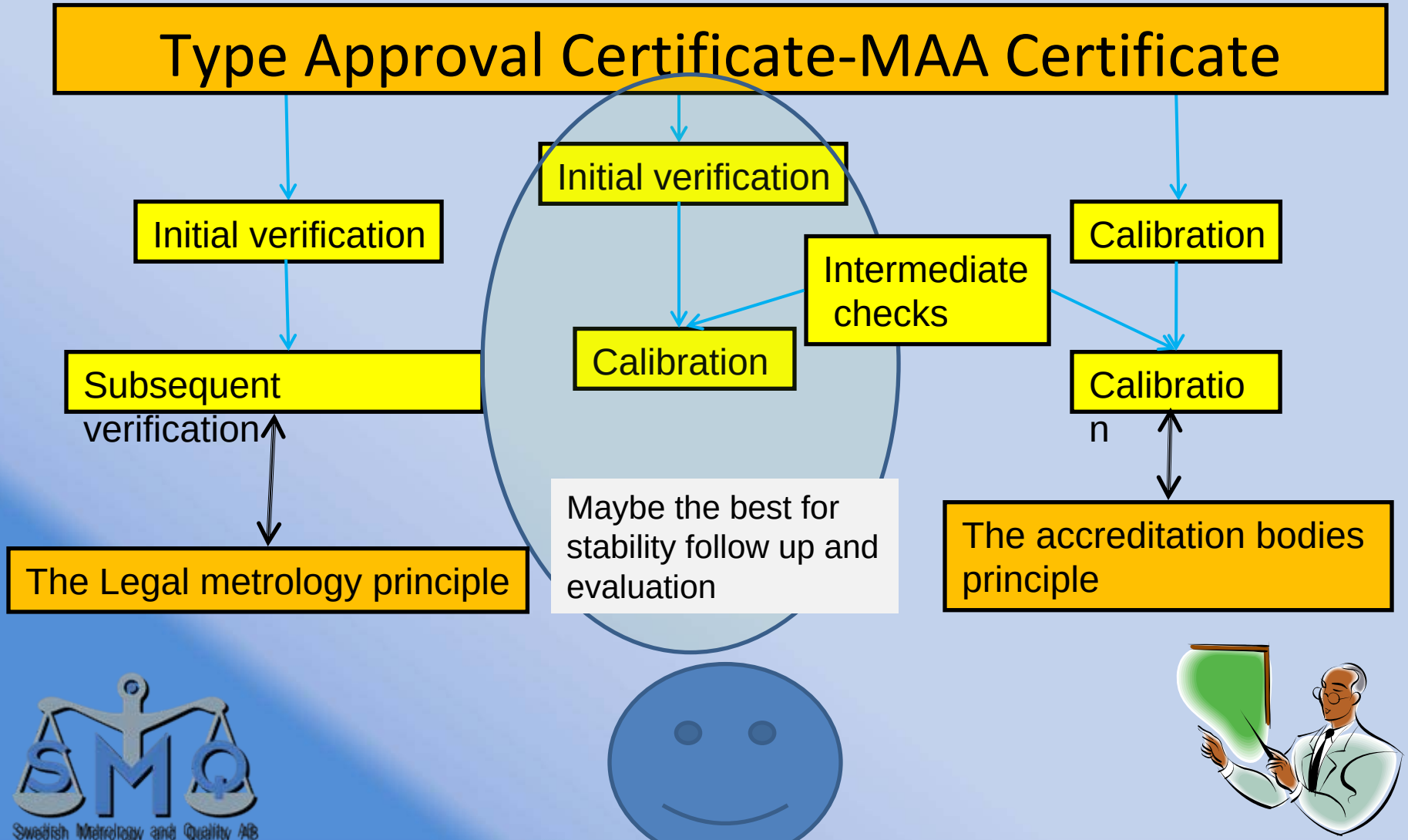
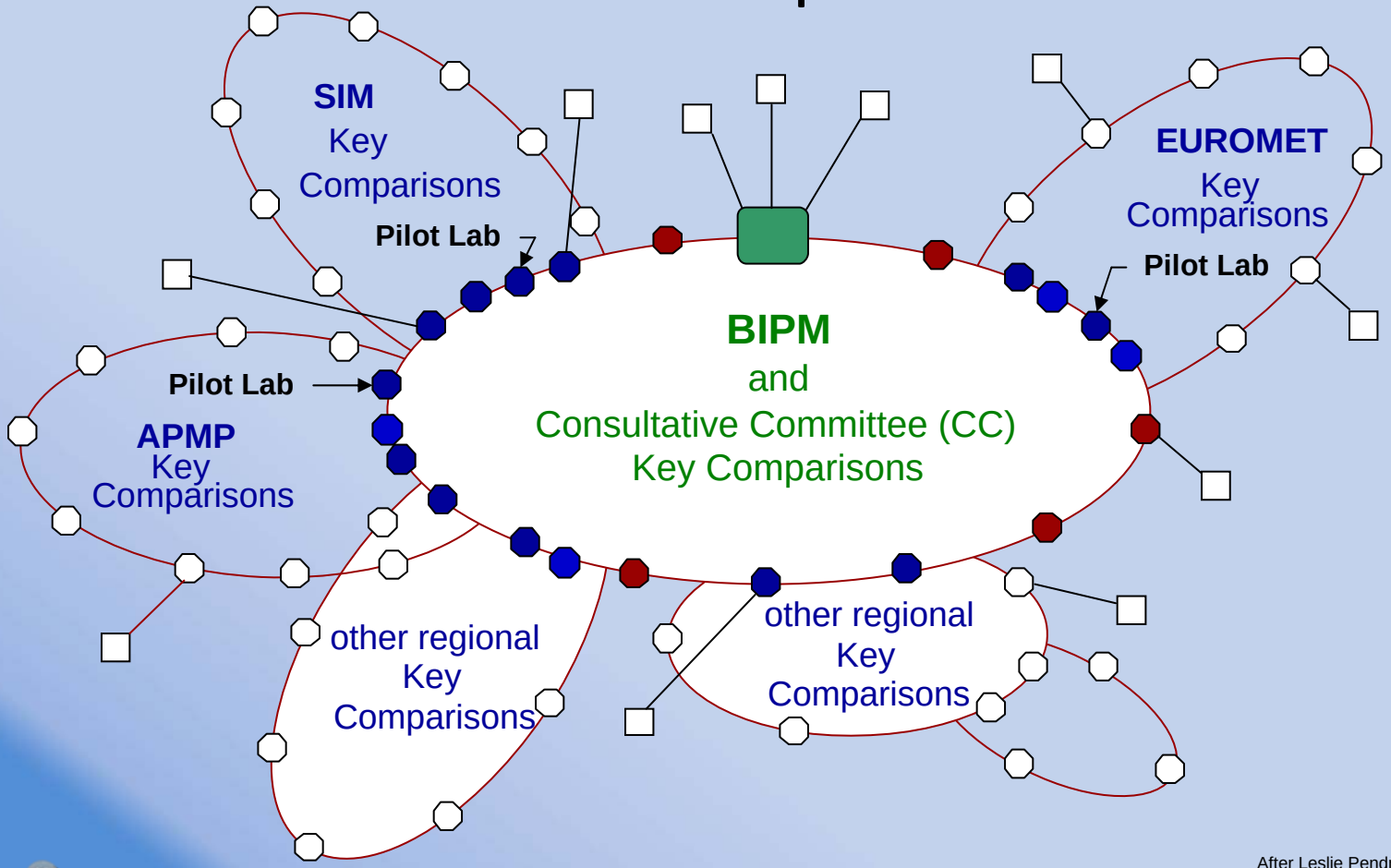
Different ways to quality



BIPM– Traceability and uncertainty and a World of intercomparisons



After Leslie Pendrill, SP

Where are Intercomparisons in Type Evaluation testing ?
Responsibility of which organisation? OIML -MAA?

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Related issues from ILAC

Important guides related to measurements in industry and OIML recommendations

- ILAC-G17:2002
- EA-4/02 (from EA)

Important knowledge

- Lead assessors understanding the OIML work and especially the Recommendations and the MAA

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Related issues from ISO

Important standards related to measurements in industry

- GUM
- ISO 17025
- ISO 17020

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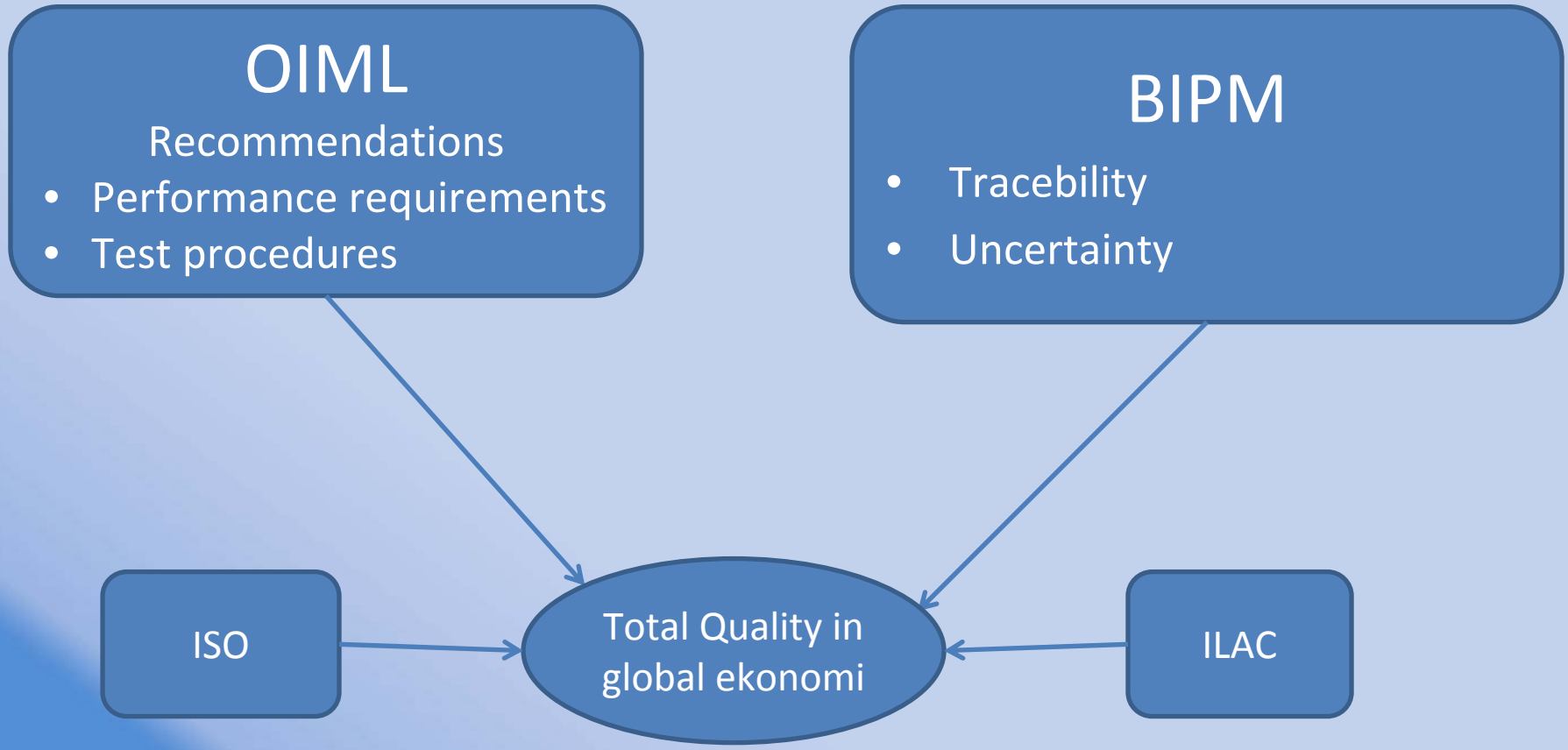
The future ?



Swedish Metrology and Quality AB

Tell me where the weighing instrument is ?

Swedish Metrology and Quality AB

Thank you for your attention

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