IRENA Innovation Week
The Age of Renewable Power

Creating an infrastructure of experts and institutions in metrology and conformity assessment in Latin America and the Caribbean

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Renewable Energies Policy and QI. The Current Framework

Renewable Energies. Situation 2015

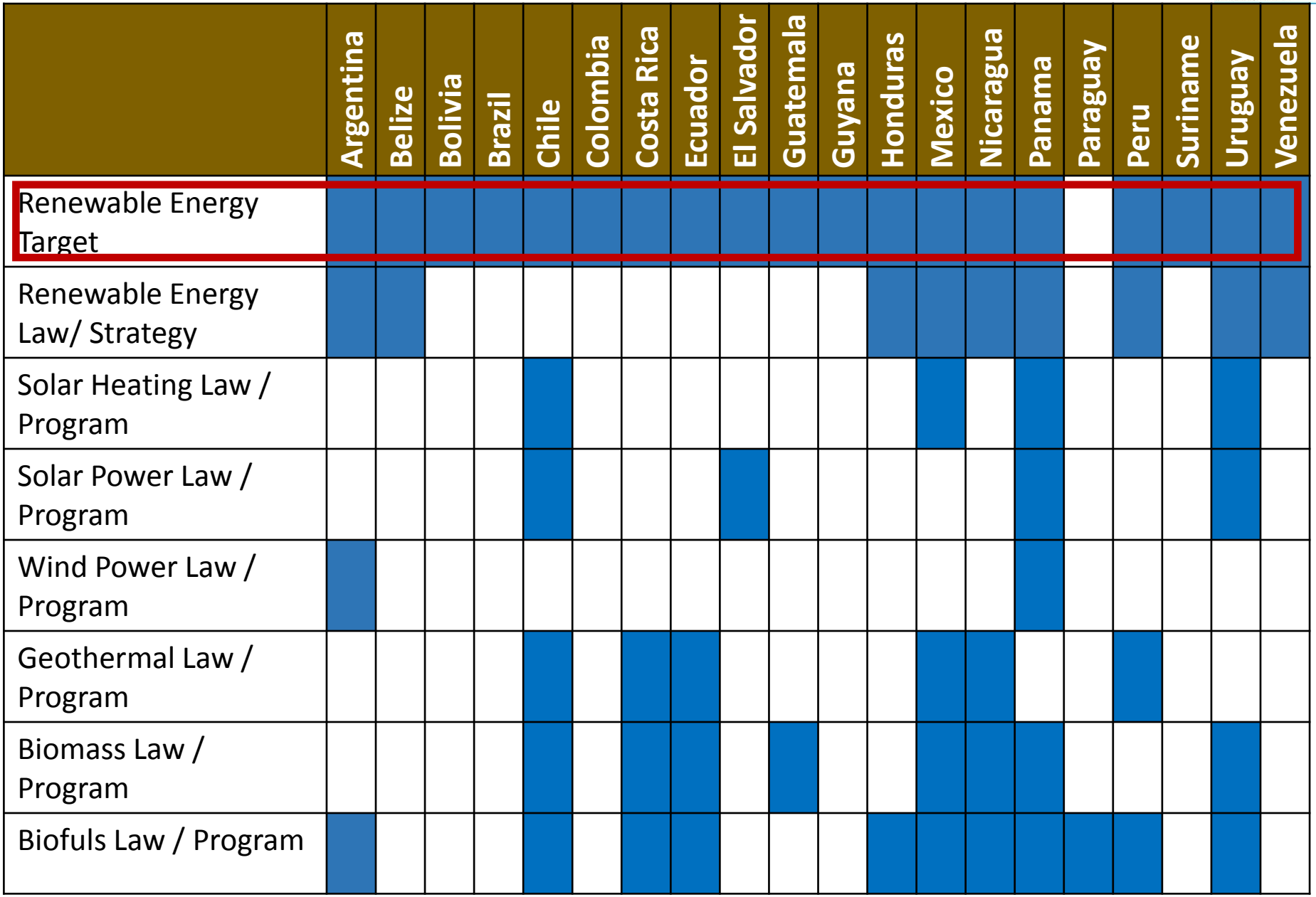
Renewable Energy Targets	164 Countries
Renewable Energy Policies to Achieve Targets	145 Countries

Source: Policy Network for the 21st Century (REN21, 2015)

Type of Renewable Energy	Growth in 2015 (GW)	Totally (GW)	%
Wind Energy	63	432	21,8
Solar Energy	47	227	11,4
Hydro Energy	35	1.209	60,9
BioEnergy	5	104	5,2
Geothermal Energy	1	13	0,7
	151	1.985	100,0

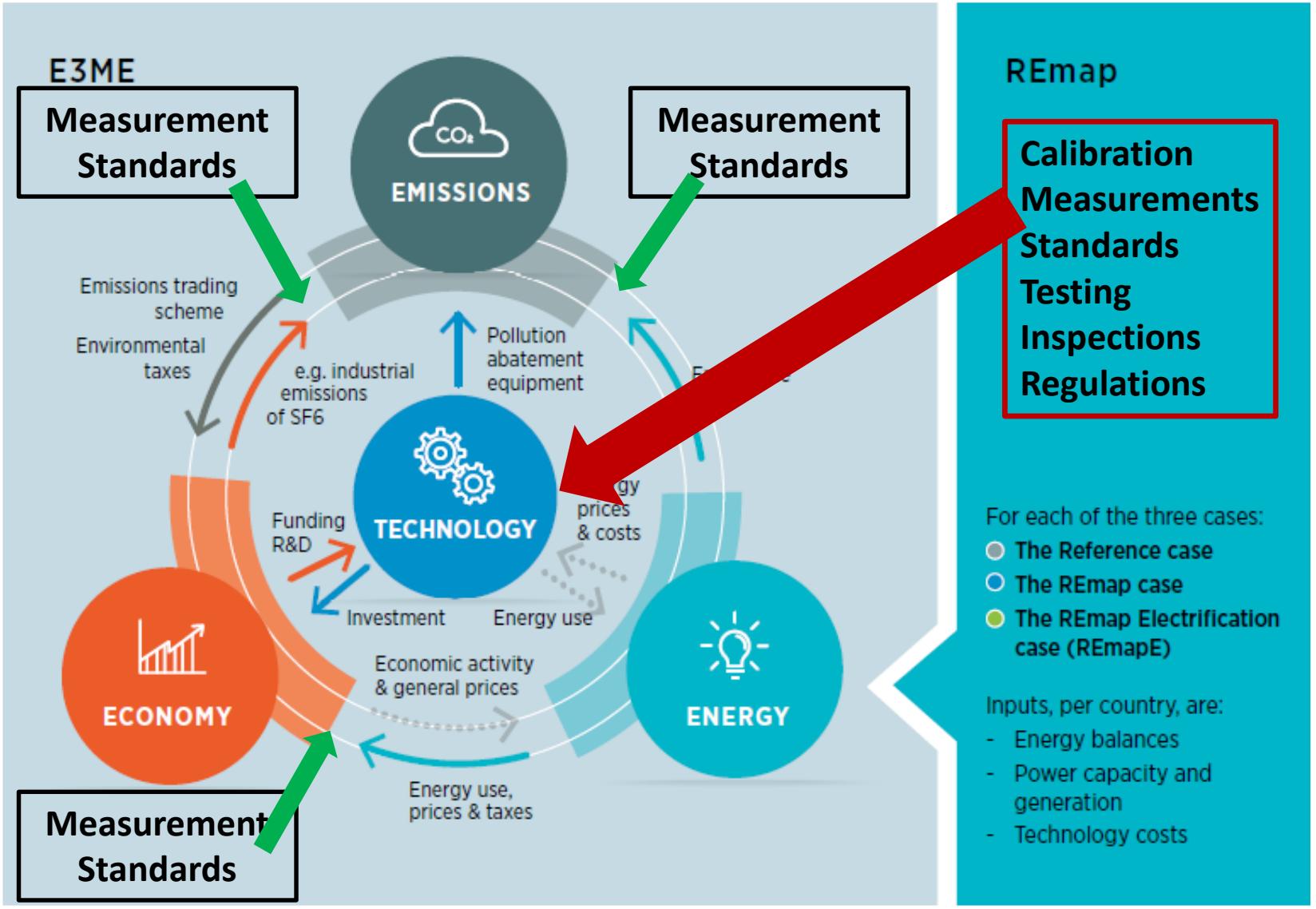
Source: IRENA 2016

Renewable Energies Policy: Example Latin America



Source: IRENA 2015

Renewable Energies: Triangle Emissions – Energy - Economy



Source: IRENA 2016

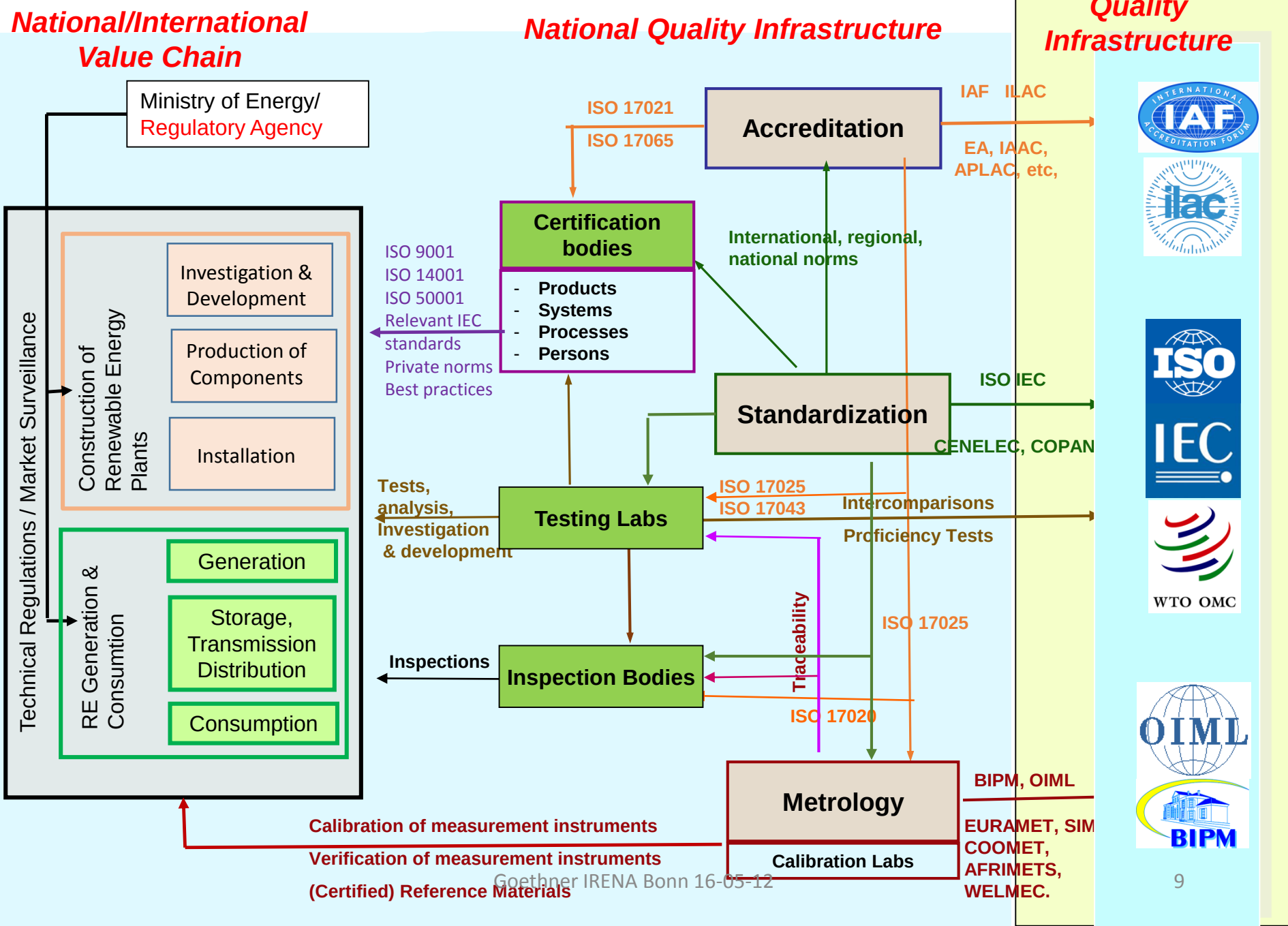
Quality Infrastructure for Renewable Energies: An Introduction

Systemic Approach: NQI Componentes and their Services

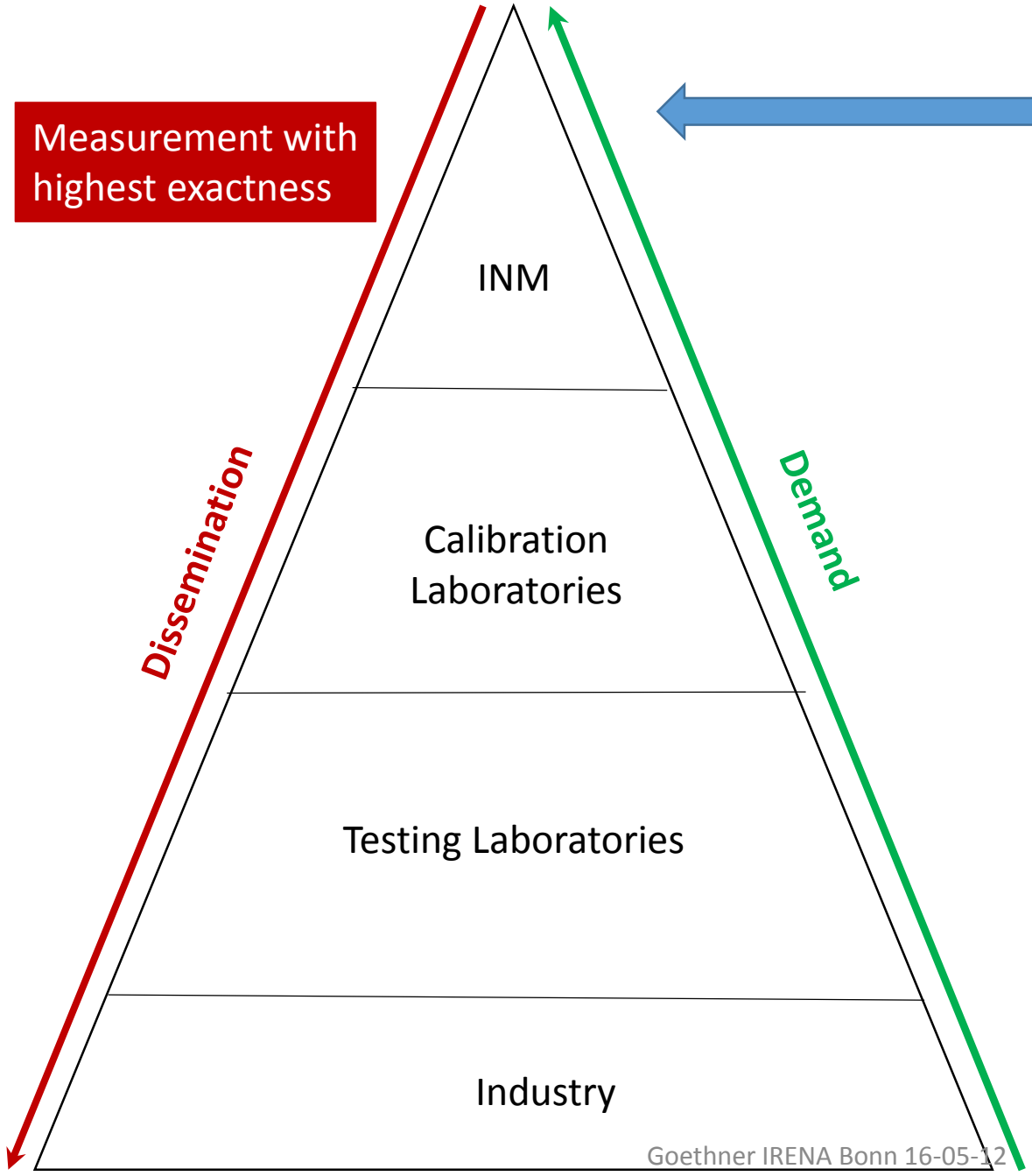
Metrology	Assures the traceability of the measurements to the International System of Units (SI), the confidence, the accuracy, and the comparability of measurements
Standardization	Formalized documention which contains the requirements of conformities of a product, a process, a service.
Accreditation	Confirms the technical competence of a conformity assessment body, i.e. testing and calibration labs, certification and inspection bodies.
Testing	Determines the characteristics of a product in comparison with the requirements of a norm.
Certification	Confirms the conformity of a product, a system, a process, a service, a person by a certificate.
Inspection	Verifies the conformity of a product, a process, etc. with general or specific requirements existing in the form of laws, technical regulations, norms and specifications.
Market Surveillance	Supervises and controls if the products which are on the markets are really in accordance with the requirements of the norms and technical regulations.
Legal Mandatory Framework	Laws, decrets, and technical regulations defining the structure and the obligatory rules of NQI.

Conformity Assessment

QI for Renewable Energies



Tracaebility Chain



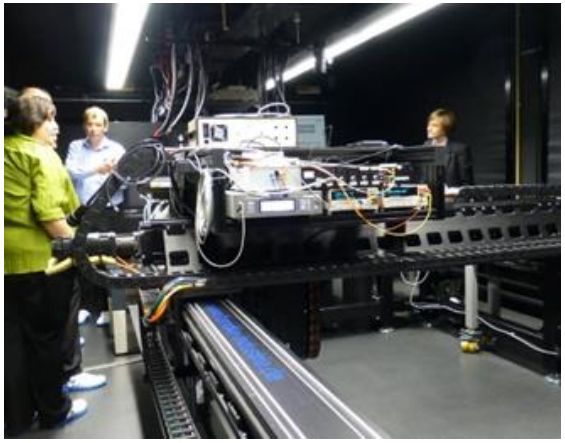
International System (BIPM/CIPRM)

Traceability Chain

Application with the necessary exactness

Traceability chain for Photvoltaics

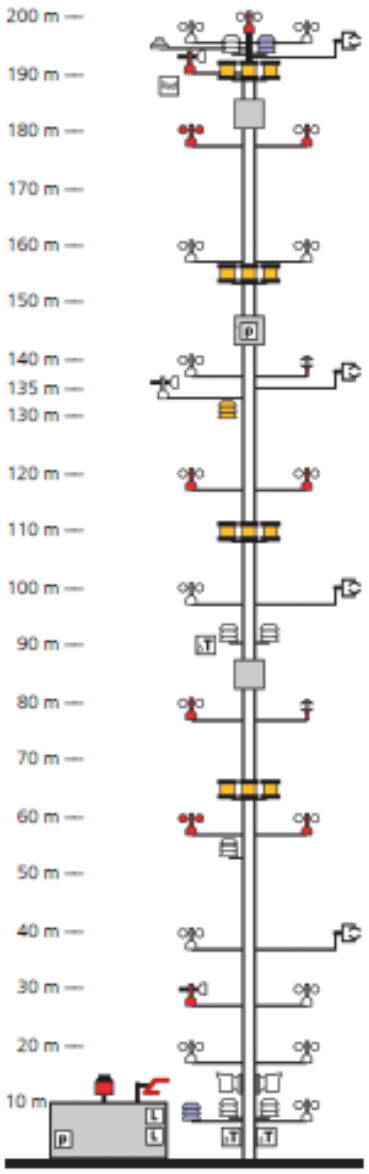
- Solar radiation and luminous flux. Traceability to the primary standard in Davos (METAS) is only assured in few cases
- Temperature
- Humidity
- Chemical substances



QI for Renewable Energies: Traceability for Photovoltaics (2015)

Country	Plants		Small installat.		Test./Cal. Lab. Radio-metry/ Photometry	Secondary Standard Solar Radiation
	Install.	Plan.	Install.	Plan.		
Argentina						
Bolivia						
Brasil						
Chile						
Costa Rica						
Honduras						
Mexico						
Peru						
Uruguay						

Mostly, the secondary standards are in hands of the National Meteorological Services, some of them under questionable environmental conditions and without relationship to the NMIs.



Traceability for wind metering and wind turbines:

- Wind speed (anometers)
- Pressure
- Temperature,
- Humidity
- Photometry (sensors)
- Length
- Fluid Flow
- Chemical substances

NMIs with CMC related to Renewable Energies

National Metrology Institutes (NMI) with Calibration and Measurement Capabilities (CMC) Published in Appendix C of the Mutual Recognition Arrangement (MRA)

Magnitud	No.	Argentina	Brasilien	Chile	Colombia	Costa Rica	Cuba	Ecuador	Jamiaca	Mexico	Panama	Paraguay	Peru	Uruguay
Electricity and Magnetism	7	■	■			■				■	■		■	■
Mass	11	■	■	■		■		■	■	■	■	■	■	■
Pressure	4	■	■							■			■	
Torque	2		■							■				
Fluid flow	7	■	■			■	■			■			■	■
Humidity	1				■									
Temperature	9	■	■	■	■	■	■			■			■	■
Length	6	■	■	■						■			■	■
Radiometry and Photometry	3	■	■							■				
Substance (Chemistry)	4	■	■							■			■	

Standardization

- State of Art unknown in many cases.
- Only few National Standardization Bodies (NSB) are really active in RE. Refers also to the 6 National IEC Committees (Argentina, Brazil, Chile, Colombia, Cuba, Mexico) .
- Standardization often State and project driven, private sector (industry) has interest only in few cases
- Many time spent for „tropicalizing“ international standards and developing national standards instead of participating in international standardization process.
- No LAC country is member of the IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications IECRE.
- Possibilities of participation in international standardization are not used.
- Positive: COPANT is promoting the participation in international standardization and information sharing.

Accreditation

IAAC: MLA Signatories 2016

MLA	ISO/IEC	Argentina	Brazil	Chile	Colombia	Costa Rica	Cuba	Ecuador	El Salvador	Guatemala	Jamaica	Mexico	Nicaragua	Paraguay	Peru	Uruguay
Certification QMS	17021	■	■	■	■	■		■				■			■	■
Certification Products	17065	■	■	■	■	■		■				■		■	■	■
Testing Labs	17025	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Calibration Labs	17025	■	■	■	■	■	■	■		■		■			■	■
Inspection Bodies	17020	■	■	■		■		■		■		■	■	■	■	
PT Providers	17043		■	■												

IAAC has 18 Full LAC Members, 15 are MLA Signatories (of 34 LAC countries)

The weak points

- Accreditation of PT Providers, Certification Bodies specialized in certification of PV, SWH, and wind energy products and systems (installation!), Inspection Bodies
- Accreditation schemes and experiences in accreditation of testing labs, inspection bodies, PT providers for RE
- Lack of technical experts
- Lack of experiences

Conformity Assessment

Some gaps in Conformity Assessment for Photovoltaics and Eolic Energy

- Traceability in Solar Radiation, Humidity, Electricity and Magnetism not sufficiently guaranteed
- Missing technical competences in calibration (Pyrheliometers, Pyranometers, Anemometers, PMA - Phasor Measurement Units)
- Only few testing facilities in photovoltaics according to international standards and best practices: Argentina, Brazil, Costa Rica, Mexico; Uruguay, Chile in implementation
- Poor technical competences and few experiences of laboratory staff
- Missing possibilities of Professional Tests (PT)
- Many researchers and developers (R+D+i) do not know that periodical calibration is necessary for exact measurements and tests
- Regional conditions not sufficiently studied (for instance solar radiation, chemical and mechanical influences in Atacama)
- Only few certification bodies installed in the region, which can certify products, installations, and systems

QI for Renewable Energies: Example Accredited Testings Labs for SWH

Country	Number of accredited Testing labs (2015)
Argentina	3
Brasil	2
Chile	1
Costa Rica	1
Mexico	4
Uruguay	2

In many countries SWH are installed but with a doubtful quality. This is also in Germany the case (approx. 50%, 20% with serious problems).

Summary: Summary: Awareness, Demand-led Capacity and Institutional Building

General Problems

1. **Till today, RE Policy has not sufficiently recognized the importance of QI for the implementation of concrete strategies and programs. Implementing/upgrading of QI according to national needs is not considered as an integral and necessary component. Financing is considered as a cost, not as an investment.**
2. **QI at the moment cannot give a satisfactory response because necessary technical competences are missing.**
3. **Many researchers and developers (R+D+i) are not aware that Research and Development need periodical calibrations of measurement instruments for exact measurements and tests.**
4. **Missing (accredited) testing laboratories working according to international standards and best practices are the current main bottleneck.**

Main issues of a demand-led QI Capacity and Institution Building for RE

Strengthening CABs

- Supporting installation and upgrading of testing laboratories incl technical advice (equipment, environm. conditions)
- Accreditation of labs, certification bodies, and inspections

Strengthening Traceability

- Solar Radiation
- Photometry
- Humidity
- Electricity and Magnetism
- Calibration labs (Pyrheliometers, Pyranometers, Anemometers)

Strengthening NSB and COPANT

- Participation of Industry and Government
- Participation in international Standardization work (ISO, IEC, etc.)

Strengthening NABs

- Training in relevant ISO standards
- Developing accreditation schemes
- Formation of technical experts

Competences of staff

- Internships
- Training in
  - testing methods according intern. standards an guides
  - application of accreditation schemes
  - of technical experts for accreditation
- Coaching
- PTs
- Experience exchange

Creating Awareness

- Government, Regulatory Agencies, Industry, R+D+i
- COP 21 (Paris)
- Impact Studies

Regional cooperation and experience exchange

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