



Quality Infrastructure for sustainable energy

The sustainable supply and use of energy creates the basis for sustainable development. The projects of the International Cooperation Department of the Physikalisch-Technische Bundesanstalt (PTB) contribute to the introduction and improvement of quality assurance services for the energy sector.

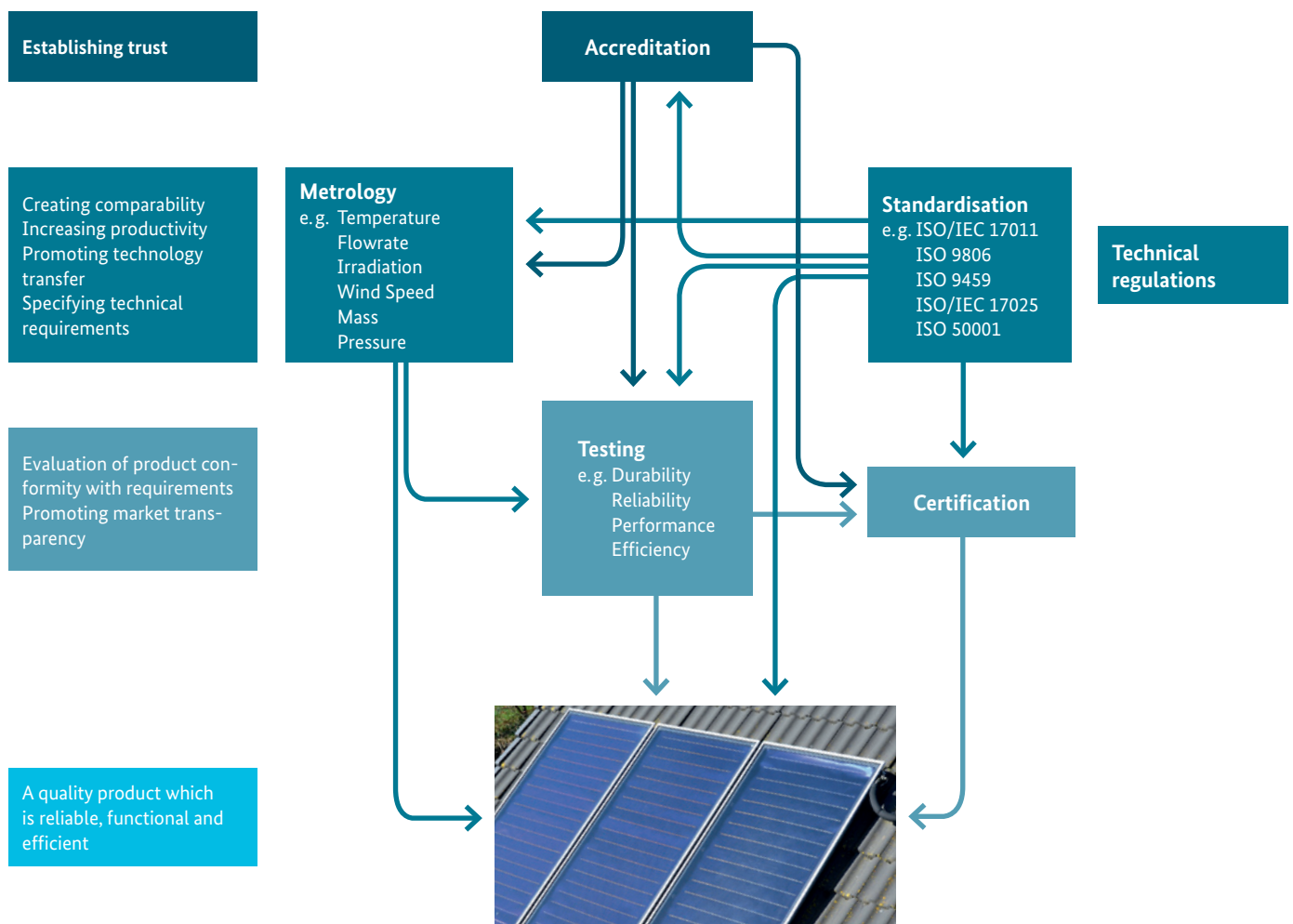
These services are necessary for exploiting renewable energies competitively, optimising conversion technologies, reducing transmission and distribution losses, and for increasing energy efficiency and environmental compatibility.

For energy generation, both the efficiency and the quality and operating life of systems are of key importance. To test profitability, an earnings prognosis based on reliable measurement data (e.g. radiation intensity, wind speed) is required. Without physically testing performance, durability and reliability, the risk exists that products which have been installed will fail to deliver the performance specified, or will even be faulty. To ensure comparability of data, measurement procedures must be harmonised and the correct measuring instruments must be calibrated. Recognised certificates verify the compliance of products and components with binding standards. During enhancements to increase the efficiency and operating life-

time of systems, as well as during characterisation of new materials, models and procedures, metrological and testing services play a decisive role. Here, development and approval may also be necessary for new measurement instruments.

Laboratories which carry out tests in accordance with valid standards are required to maintain a recognised quality management system, as well as furnish proof that their measuring instruments undergo regular inspections. An accreditation then certifies that the laboratory possesses the corresponding expertise.

QI for sustainable energy, using the example of solar water heating



© Physikalisch-Technische Bundesanstalt

Following successful testing, a product can go through the certification process. In some countries, programmes which promote renewable energies and energy efficiency have already made fulfilment of certified quality criteria a condition for funding. This ensures that the intended impact of these programmes can come to fruition.

Due to the increasingly decentralised supply of renewable energies, the structure and control of electrical grids are becoming more complex. New procedures are needed to supply electricity

to the grid from renewable energy sources with low transmission and distribution losses, and to make the grids more robust. To do so, reliable transmission and energy-measuring technology is required, as is the development of new standards, procedures and devices. Legal metrology protects end users by providing reliable measurement of consumption rates.

The economical consumption and efficient use of energy make a significant contribution to resource conservation and climate protection.

The lower the energy losses are during the production, conversion, distribution and utilisation of energy sources for a particular energy service, the higher the energy efficiency is. Here, contributions to the Quality Infrastructure include the specification of standards in the field of constructional and building technology (such as for insulation, heating, cooling, ventilation and lighting), and consumption labelling for electrical devices.

For logical reasons, and in order to increase acceptance, internationally recognised standards are used for this purpose; in order to verify compliance with these standards, corresponding laboratories and certification bodies are needed.

By introducing energy management systems in accordance with ISO 50001, businesses and organisations can establish a methodical system of energy management and implement technical measures in order to improve their energy efficiency in a systematic and long-term way.

Our contribution

Many developing countries and countries in transition lack internationally recognised capacities for measurement, testing, standardisation, certification and accreditation. Under such conditions, laws, ordinances, technical regulations and quality requirements can only be implemented with great difficulty.

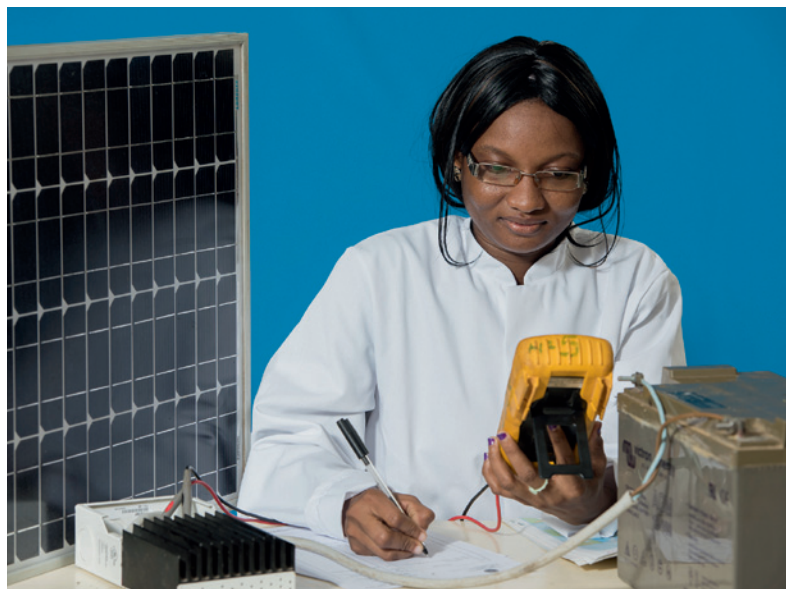
For this reason, PTB qualifies experts and managers in public institutions and in the private economy, thereby providing assistance in the establishment of a Quality Infrastructure for renewable energies and energy efficiency. National and international experts provide consultation to the various institutions, and their employees are professionally trained and take part in the regional and international exchange of experience.

Our impact

In a way which is in line with demand, PTB supports the establishment of technical expertise in its partner countries in the fields of standardisation, measurement, accreditation and conformity assessment. Support is also provided for linking the Quality Infrastructure to the energy sector, whose stakeholders receive advice on how to make effective use of QI services.

Establishment of technical expertise and a meaningful division of labour can be organised very efficiently via regional technical organisations. Harmonised procedures and requirements allow services to be mutually recognised.

This makes it possible for manufacturers to produce and market systems and energy-efficient devices locally. Businesses can identify energy-saving potentials, reduce their manufacturing costs and increase their competitiveness. International trade and technology transfer are made easier by means of harmonised requirements. Electricity producers, investors and funding institutions receive reliable decision-making tools for their investments such as selecting sites,



© PTB/Ralf Bäcker

technologies, and maintenance concepts. New technologies are disseminated and accepted more quickly and efficiently. Electricity grids are made more intelligent, more efficient and more robust, and the energy supply is made more reliable. Consumers gain trust in the functionality and operating life of photovoltaic, solar water heaters and wind power plants, their consumption measurements are calculated correctly, and they can rely on the available consumer information when choosing electronic and household devices.

In the energy sector, the International Cooperation Department of PTB strengthens the existing Quality Infrastructure so that locally available, demand-oriented services can be offered with expertise. This support is offered with the intention of enabling businesses to manufacture their products in such a way that they are reliable, of high quality, internationally competitive and protective of resources. Ministries and regulatory bodies will be able to make increased use of the instruments of conformity assessment in order to determine safety standards and limits, and to monitor compliance with them.

Internationally, cooperation between countries will be improved, and regional integration strengthened.



Fotolia



Published by **International Cooperation**
Physikalisch-Technische Bundesanstalt
Bundesallee 100
38116 Braunschweig, Germany
www.ptb.de/9.3/en

Cover photo Fotolia
Responsible Dr. Marion Stoldt
Text Ulf Hillner, Lieselotte Seehausen, Lea Zeppenfeld
Translation PTB/Charles Minnick
As of April 2016