

**IEA, ISO, IEC workshop on  
"International Standards to promote energy efficiency and reduce  
carbon emissions"  
Paris, 16-17 March 2009**

**Results and directions for future action**

## **The workshop**

**Partner organizations:**

International Energy Agency (IEA)

International Organization for Standardization (ISO)

International Electrotechnical Commission (IEC)

**Participants:** 290 experts representing the major players from standardization, the private sector and public policy makers

**Objectives:** to map out the most important areas where International Standards are required to support energy efficiency and reduce carbon emissions.

The discussions covered key technical, policy and administrative themes related to energy efficiency standardization, with a view to reaching conclusions that can be fed into relevant high-level international processes, strengthening the cooperation between public and private sectors.

## **Results and directions for future action**

Presentations and discussion panels provided an overview of needs and challenges concerning energy efficiency in a variety of fields, highlighting the links with standardization activities and the importance of the international standardization system for this sector.

The speakers' presentations and rapporteurs' summaries are available on the workshop's Web site [[http://www.iso.org/energy\\_efficiency\\_workshop](http://www.iso.org/energy_efficiency_workshop)]

The workshop confirmed that key players in the energy sector consider technical standards and notably International Standards essential instruments to support the implementation of energy efficiency practices. They are also willing to contribute to and collaborate in the development of standards in this field.

Particular attention was drawn to the fact that technical standards underpin all private and public policy actions that seek to deliver energy savings and greenhouse gas emissions reductions through enhanced energy efficiency. Without such standards, it is not possible to define efficiency and to enhance it. Despite the considerable degree of effort that has already

gone into developing technical energy efficiency standards, the workshop heard that a great many areas of energy use and supply are still not covered by these. Therefore, completion of the portfolio of standards is of primary importance if public policy and private sector energy efficiency objectives are to be achieved..

Participants cited numerous success stories of how International Standards have helped and continue to contribute to promoting energy efficiency in power generation and major energy use domains. They also underlined that standards development and take-up in these domains must be strengthened and significantly accelerated to cope with the new dimension of the challenges and the urgent need for more globally relevant standards.

This document is an attempt to summarize the input received from stakeholders. It highlights a list of recommendations addressing general transversal issues as well as those concerning sector specific areas – to be considered by IEA, ISO and IEC, as well as by public and private organizations that participate in developing standards.

## **1. General issues**

Participants agreed that effective implementation of the IEA's 25 recommended energy efficiency policy measures, which cover all major energy end-uses, requires consistency in terminology and indicators to ensure their usability by all parties within sectors and between sectors and nations. This is **an urgent requirement**, because a lack of consistency in definitions, combined with a high diversity and variety of existing metrics and test procedures, is a global problem that hinders broader international progress in energy efficiency delivery. Lack of standardization can result in the use of inappropriate metrics and hinders the ability to perform cross-border comparisons.

In this respect, the initiative of AFNOR (the French national standards body) in cooperation with the UTE, the French national committee of IEC, was welcomed. They have proposed the establishment of a joint ISO/IEC project committee on international terminology for energy efficiency and renewable energy sources. Participants urged all the concerned parties to proceed rapidly with this initiative and contribute effectively to the process by building on high-quality work already done by relevant technical committees, institutions and stakeholder groups.

The other main recommendations concerning general issues are listed below:

- Highlight and promote the complementary relationship between public policies and technical standards
- Communicate that standards provide technical solutions (for example test and measurement procedures ensuring repeatability, reproducibility and representivity at reasonable cost) and do not attempt to define targets or incentives, which are the exclusive responsibility of public institutions
- Public authorities and intergovernmental organizations can indeed derive substantial value from standards and particularly International Standards. These provide a consistent and clear framework of technical specifications and management practices

(including conformity assessment), for the development and implementation of public policies in the field

- Encourage participation in the standards development process by all stakeholders with relevant interests in promoting energy efficiency and reducing carbon emissions. It is particularly important that representatives of public authorities and consumers (wherever relevant) are engaged from the earliest stages of the standardization process, helping to set priorities and to consider energy efficiency and carbon emissions as a key driver in defining and measuring product and systems-level energy performance
- Improve coordination and optimize experts' involvement in on-going standardization work at the sectoral, national, regional and international levels and ensure the exchange of information and promotion of existing standards. This is an important priority as fragmentation leads to duplication of work, delays and the dissemination of incompatible frameworks
- Enhance the standardization process by increasing efforts within standards committees to give priority to standards that facilitate evolving technology, environment and policy requirements
- Ensure inclusiveness and balanced representation of interests within standards committees (the mix of stakeholder groups and geographical regions)
- Optimize the flexibility and timeliness of standardization processes
- Adjust standardization processes and deliverables to be more adaptive in addressing fast-moving technologies and evolving usage contexts of products and services.

## **2. Specific areas**

### **Energy management**

- Development of the International Standard ISO 50001 for energy management is fully supported and should be carried out rapidly
- There is a need for an industrial energy efficiency standards portfolio linked to ISO 50001, covering various levels, including supporting systems, technical assistance skill sets, and measurement and verification (M&V) issues
- There is already a great deal of activity taking place at the national and regional levels in these areas, so good coordination at both these at sectoral and international levels is needed.

### **Industrial systems**

- There is a significant opportunity to improve energy efficiency within industrial systems (compressed air, pumping, steam, fans, etc), yet this is currently only weakly captured due to a lack of awareness and the limited number of individuals with suitable technical skills and training (especially in emerging economies and developing countries)
- Benchmarking of energy intensive industrial sectors is impeded by limited data and lack of standardization in reporting. A global effort is needed to increase the availability of reliable data on industrial energy use, with appropriate safeguards for proprietary data

- Work on system assessment standards should be encouraged to ensure coordination of sectoral, national, regional and international initiatives.

### **Power generation**

- For both power generation and transmission/distribution, the complexity of systems creates significant variations in the reporting and representation of operational efficiency based on local conditions (fuel type, ambient conditions, type of cleaning, type of cooling)
- Developing standards for future generations of facilities based on integrated gasification combined cycle (IGCC) and carbon capture and storage (CCS) and transmission (distributed generation) will be even more complex
- Progress toward better standardization in reporting will require substantial further analysis and negotiation.

### **Buildings**

- Buildings are responsible for a large proportion of the world's energy use and CO<sub>2</sub> emissions
- Policy targets for low or even zero carbon emissions new buildings are important, but it is even more important and challenging to tackle the efficiency of the existing building stock
- There are many existing standards for test procedures and calculation methods covering a variety of aspects of energy use in buildings. However, it is critical to extend the scope of the standards to cover methods of calculation and verification of the integrated performance of buildings. These extended standards will have an important role in supporting the definition of targets and implementation measures by national governments
- Existing assessment tools adopted at national level (such as CASBEE, BREEAM and LEED) have proven to be effective in encouraging improvements in the energy efficiency of buildings. These experiences need to be shared in the development of International Standards.

### **Electrical and electronic appliances**

- The residential and commercial sectors account for about 60 % of global electricity consumption, and the share is steadily growing
- Energy efficiency policies targeting the efficiency of individual end-uses are often effective and in many countries have helped to curb the growth of appliance energy consumption over the past two decades. However, efficiency of energy use in the residential sector can be further dramatically improved. For example, according to the IEA, 35 % of total residential electricity use in OECD countries could be saved by the broader deployment of existing efficient household appliance technologies
- The coverage of energy efficiency policies targeting improvements in residential electricity consumption is far from complete and existing measures need to be made

more stringent. A number of development and implementation issues need to be tackled to enable the full savings potentials to be realized

- International Standards continue to make an essential contribution to this effort in providing a common language, test procedures and calculation methods that can be used as solid foundation by policy makers
- However, the situation is far from perfect. Whilst characterization of energy use might be straightforward, ambient and usage conditions of the various products vary considerably and to take them fully into account can be challenging and time consuming. Technical options do exist which would allow International Standards to be fully applicable to diverse locally specific situations, yet these require additional effort to be fully incorporated within the standards. The relatively weak engagement of many public authority stakeholders within the standardization arena was identified as an on-going constraint as was the limited resources committed to standards development.
- In order to make further progress and to unleash the full potential of International Standards in this field, it is important to pursue:
  - More engagement and representation of public authorities and consumer interests in standards setting
  - Development of smarter test procedures (able to accommodate local conditions and different usage patterns)
  - High level coordination between ISO and IEC with IEA and other relevant intergovernmental entities, aiming at coordinating strategy and overall priorities for the field
  - Increased efforts to ensure timeliness of the standardization process.

### **Networks and data centres**

- The electricity consumption of the ICT sector is still relatively small (as a fraction of total electricity use) but it is by far the fastest growing segment of energy demand. The growth is, in particular, driven by the exponentially growing volume of traffic over the Internet. For example, in Japan, the volume of traffic on the Internet is growing at an annual rate of 40 %. If this rate is maintained, within 10 years, sustaining Internet traffic will require the entire electricity generated in Japan today
- Companies and institutions are addressing these challenges with technology (for example, through R&D of more energy efficient computer architectures and of advanced communication protocols that are orders of magnitude less "power hungry" than the current ones) and by defining good management practices, e.g. how to structure and operate data centres in an energy efficient way
- These developments are all relatively recent. Metrics defining the energy consumption of systems and services and models characterizing patterns of use and consumption in different conditions (with the related test procedures), are in the early stage of development. The matter is intrinsically complex and further complicated by the high speed of technology development in the sector, which can quickly render obsolete existing models and performance targets
- Several initiatives driven by industry consortia and by public institutions (e.g. within the EU and US) are underway and significant efforts have been made, for example, to

define voluntary codes of conduct engaging manufacturers and operators in various market segments

- However, the fragmentation of initiatives and actors generates confusion and tends to give mixed messages to industry and consumers while making it very difficult to establish a solid framework that can influence the overall market orientation
- International Standards for terminology, metrics, measurement and best practices in this field are definitely needed and very welcome
- In order to succeed, ISO, IEC and ITU should undertake a cooperative effort, building on the work already done by the relevant private and public sector actors and engaging, whenever appropriate, consumer interests (consumer awareness and behaviour is a critical factor). Particular attention should also be given to the speed of technology change, considering dynamic models.

## **Transport**

- The transport sector accounts for more than a quarter of total global final energy consumption and CO<sub>2</sub> emissions. This share, which has been steadily growing over the past two decades, is expected to further increase in the future; primarily due to the development of road traffic in emerging economies. In addition, current transportation modes are largely dependent on oil and therefore directly responsible for their own GHG emissions
- Energy efficiency improvement of transport is imperative, in particular for road vehicles, which account for nearly 90 % of the total sector energy use
- Improvement of the calculation of GHG emissions of vehicles and transportation services is also urgently needed, particularly in relation to the proliferation of incompatible carbon calculator models which produce inconsistent results
- Long-standing relationships exist in this field between industry, regulators and standardization organizations, exemplified by the work carried out in the framework of the UN/ECE and in cooperation with ISO and IEC
- However, to achieve the energy efficiency goals that policy makers are introducing in most countries, a number of challenges have to be tackled, as summarized below
  - Significant improvements are needed in standards for vehicle fuel consumption tests to take into account more realistic driving conditions and different regional usage patterns (for example, driving in congested urban areas is the most common road vehicle trip in developing countries)
  - Fuel consumption test procedures need to be extended/adapted to cover hybrid vehicles
  - The development of standards covering the other major components of vehicles (and their operating conditions) which have significant impact on fuel consumption, must progress expeditiously. Particular importance should be given to standards covering metrics and testing of tyre rolling-resistance, as well as air conditioning and other in-vehicle sub-systems
  - Consumer interests need to be more substantially and systematically engaged, with a view to the development of clear, consistent and reliable information for

consumers, supporting both purchasing choices (e.g. through labelling systems) and eco-friendly operation of vehicles

- A significant effort is required to develop a consistent international framework of transparent metrics and calculation methods for GHG emissions of vehicles and transport services (covering the entire chain of functions and processes) for use as a reliable reference model by carbon trading schemes.