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Futur*E*nergy

- Building energy efficiency with ISO standards
- ISO 22000 on the menu



ISO Focus+

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Green energy

ISO standards fuel opportunities for a sustainable future

The projections are overwhelming: nine billion people on this planet within the next forty years. Under a “business-as-usual” scenario, this could mean a more than doubling of global carbon emissions by 2050.

In addition, there is now a growing realization that hoped-for achievements in the WTO Doha development round, United Nations climate change negotiations and global reforms in the financial sector are elusive and, at worst, impossible. We all have a sense of fatigue associated with global turmoil experienced in this last decade including spiking food prices, oil supply disruptions, financial and economic crises, as well as devastating natural disasters.

Yet in this era of multi-lateral setbacks, uncertainty and economic upheaval, there remain signs of hope and new opportunities. With “top-down” going at times “belly-up”, there is a growing realization that market and stakeholder-based solutions can lead by example and can help to point directions for a more prosperous and sustainable future. In fact, such approaches are perfectly suited to deliver results in an imperfect world.

In its recently released paper on “Green Economy: Pathways to Sustainable Development and Poverty Eradication”, the United Nations Environmental Programme (UNEP) reports that increasing energy supply from renewable sources reduces risks from rising and volatile fossil fuel prices.

UNEP indicates that the current fossil fuel-based energy system is at the root of climate change, and that the energy sector is responsible for two-thirds of greenhouse gas emissions, with the costs of climate change in terms of adaptation, being estimated to reach USD 50 - 170 billion by 2030.

This may well be the case, but it is also a reality that, even with ever-important investments in renewables, the world will unfortunately continue to depend on oil for its energy needs for the foreseeable future. And in the context of a ballooning population and ever-increasing energy demand, the necessity for the most efficient use of all available sources of energy is paramount.

Therefore it's no accident that this issue of *ISO Focus+* puts the spotlight on energy and the impact that global, market-based, stakeholder solutions of ISO International Standards can have on energy metrics, efficiency, usage and performance. In fact, with a number of the initiatives featured in this edition, it is very much about being pragmatic and focussed. ISO technical committee ISO/TC 244 on industrial furnaces and associated processing equipment describes new ISO standards under development that will help to measure energy balance and calculate energy efficiency. ISO/TC 118/SC 6 on air compressors and compressed air systems further describes its work on approaches to energy assessment. And in an effort to provide global consistency on the varying methodologies for quantifying the carbon footprint of products, Klaus Radunsky, Nobel Peace Prize Laureate, describes progress on achieving consensus on parameters for such an important ISO standard.

ISO has given high priority to sustainable development.

On a systemic and organization-wide level, the landmark work of ISO project committee ISO/PC 242 on energy management is featured, along with a case study demonstrating its potential impact. The new ISO 50001 promises to be a groundbreaking ISO standard that should be a “game-changer” for voluntary, market-based efforts to achieve substantial energy savings and performance.

We are also pleased to profile the early work of an ambitious new ISO committee developing sustainability criteria for all forms of bioenergy (ISO/PC 248). The significance, stakeholder interest, developing

country impact and (unfortunately) politics of this subject cannot be underestimated.

This leads also to the next big global event in this space: the United Nations Conference on Sustainable Development in June 2012 – the so-called “Rio+20”. The conference takes as its starting point the global community’s commitment to sustainable development (with its economic, environmental and social pillars) since the United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992. The conference will examine two themes:

- The green economy in the context of sustainable development and poverty eradication
- The institutional framework for sustainable development in relation to reviewing progress and renewing political commitment.

It is therefore important to note that ISO Council, through a resolution at its March 2011 meeting, has given high priority to sustainable development by establishing a Task Force on associated sustainability terms and definitions (in coordination with TMB), and by confirming ISO’s involvement in the preparatory process for Rio+20. Given ISO’s pragmatic, bottom-up global solutions, this contribution should come as a ray of hope for a challenging and uncertain energy future. ■



Kevin McKinley
ISO Deputy Secretary-General.

ISO addresses UN sustainability conference

earthsummit2012

Addressing a UN panel on sustainable development in early March, ISO Deputy Secretary-General Kevin McKinley called for a strengthened focus on international standardization in pursuit of a greener global economy.

The United Nations Conference on Sustainable Development, also known as Rio 2012, will be hosted next year by Brazil in Rio de Janeiro. At the March meeting, held in New York to prepare the agenda for the 20-year follow-up to the historic 1992 United Nations Conference on Environment and Development, Kevin McKinley noted that voluntary standardization “makes use of market forces that encourage organizations to take action – action that fuels and sustains green economy objectives.”

The ISO Deputy Secretary-General presented the successful adoption in late 2010 of ISO 26000, *Guidance on social responsibility*, as a concrete example of how a consensus-based, multi-stakeholder system can achieve global agreement on approaches to green economy issues at the organizational level.

He said that standardization should be seen as a strategic instrument in the tool-box of the UN’s efforts to enhance global, voluntary actions that can have an important impact on fostering economic growth while respecting core environmental values, and contributing to the alleviation of poverty.

Codex endorses joint ISO/IDF guidelines for detecting melamine in milk

Guidelines developed by ISO and the International Dairy Federation (IDF) to help prevent a recurrence of the crisis caused by milk adulterated with melamine that affected thousands of children, have been endorsed by the Codex Alimentarius Commission, the United Nations body responsible for food safety that protects the health of consumers and helps to ensure fair trade practices in the food trade.

In 2008, a number of children died and many became seriously ill after drinking milk contaminated by melamine. The substance, which is used in the manufacturing of fire-retardant plastics, had been added to milk sold by some companies in order to make it appear as having higher protein content. In humans, ingestion of melamine can cause kidney stones and renal failure. This is particularly dangerous for babies and small children for whom it can prove fatal.

To help detect and prevent future adulterated milk products from entering the market, ISO and IDF prepared technical specification (TS) ISO/TS 15495 | IDF/RM 230:2010, *Milk, milk*

products and infant formulae – Guidelines for the quantitative determination of melamine and cyanuric acid by LC-MS/MS, which was published in 2010.

At its 32nd session, in March, the Codex Committee on Methods of Analysis and Sampling (CCMAS) endorsed the joint IDF/ISO guidelines for milk, milk products and infant formula. The endorsement of these guidelines means that an internationally harmonized procedure has now been approved that will allow authorities to check the level of melamine in powdered infant formula against the recently adopted Codex maximum level of 1 mg melamine per kg of product.



CCMAS is recommending this method for final adoption by the Codex Alimentarius Commission in July 2011. Codex has already adopted more than 60 joint IDF/ISO standards for methods of analysis which facilitate international trade in dairy products and protect the consumer.

Obama dedicates UN building in honor of standards champion Ronald H. Brown

President Barack Obama recently dedicated a new United Nations building in memory of standards advocate Ronald H. Brown, the late US Secretary of Commerce under President Bill Clinton. The Ronald H. Brown United States Mission to the United Nations Building will serve as home to the US delegation to the UN.

A champion of standardization, Mr. Brown is recognized for breaking down barriers to democracy and trade around the globe. He was killed in a plane crash in April 1996, while leading a trade mission to the former Yugoslavia.

“Ron Brown embodied the values and the ideals, that sense of possibility, that is at the heart of the American story,” remarked Mr. Obama in his dedication speech.

In recognition of Mr. Brown’s contributions to advancing US trade through standardization,



President Barack Obama.

the American National Standards Institute (ANSI) and the World Standards Day Planning Committee honour his memory each year with the prestigious Ronald H. Brown Standards Leadership Award. Presented annually during the US Celebration of World Standards Day, the award recognizes demonstrated leadership in promoting the role of standardization in eliminating global barriers to trade.

ISO Secretary-General talks SR with students

ISO Secretary-General Rob Steele gave a presentation at the Graduate Institute’s Villa Barton entitled “Social responsibility and ISO 26000”.

His presentation focused on ISO 26000:2010, *Guidance on social responsibility*, an International Standard released by ISO in 2010 providing organizations information on the concept and outlining ways they can integrate it into business practices as well as how to communicate about it.

ISO 26000 is an effective contribution to sustainable development, Rob Steele said. The goals of the document were to create common terminology in the field of social responsibility and raise awareness of the topic as well as increase stakeholder engagement and confidence, according to Mr. Steele.

He went on to describe the principles and nature of the ISO 26000 document which focuses on issues such as accountability, transparency, ethical behaviour, respect for laws and norms as well as human rights and stakeholder interests. The standard was created to provide guidance but not to be used for certification or creating management systems as is the case with some of the most well-known ISO standards such as the ISO 9000 series for quality management or the ISO 14000 series for environmental management and others, he said. ■



The Graduate Institute’s Villa Barton in Geneva, Switzerland.

Carole Le Gall

Scientific and Technical Centre for Building



Photo: Eric Fligny/Aleph

Carole Le Gall has been the Chief Executive Director of the Scientific and Technical Centre for Building (CSTB) in France since December 2008. Together with a Chinese counterpart, she also co-chairs ISO's Strategic Advisory Group on Energy (SAG E).

From 2006 to 2008, Ms. Le Gall was Director of the French Environment and Energy Management Agency (ADEME), in charge of defining the strategy and action plan in the energy, air and noise fields. She was also responsible for the management of the head office technical teams.

From 2001 to 2006, Ms. Le Gall was Deputy

Managing Director of Nantes Métropole (the urban community of Nantes, France) in charge of economic development, research and training, then of international metropolitan development.

Prior to this, she occupied the positions of Divisional Head of the Regional Directorate for Industry, Research and Environment (DRIRE) in the Loire region of France, and Office Director in the French Ministry of Economy, Finance and Industry.

Ms. Le Gall is a Chief Engineer from the *Corps des Mines* and holds a Master of Science degree (Civil and Environmental Engineering) from the Massachusetts Institute of Technology (MIT).

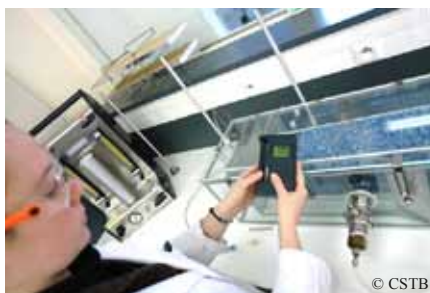
ISO Focus+: *As the Chief Executive Director of the Scientific and Technical Centre for Building (CSTB) and Head of the Sustainable Building Alliance, how important are standards to your day-to-day work?*

Ms. Le Gall: Standards are important. Construction is a system, so if we want global performance, it is necessary to manage the interfaces. By this I mean to be able to rely on a certain number of conventions which enable the different players in the construction industry to collaborate.

We use three types of standards in construction:

- Standards which define construction products or equipment
- Standards for commissioning products and equipment (best practice)
- Cross-industry standards, for integrating performance.

CSTB relies considerably on standards on two levels. Firstly, we are an “implementer of standards”, in particular, we certify products and works (either directly or through our subsidiaries Certivea, Cequami, Certita and Certisolis). Secondly, we strive to meet the needs of a building industry that is constantly evolving at an ever increasing rate, particularly given the challenges of energy performance.



Sanitary evaluation of building products.

CSTB does this by constantly carrying out assessment of innovations in the industry. When these products reach a stage of important development, they may then give rise to standards. We are thus “innovators” of standards. In this regard, we are working with all the current French bodies, as well as with our European partners at the European Committee for Standardization (CEN) and our international partners at ISO.

ISO Focus+: *We understand that CSTB is a partner of AFNOR’s (the ISO member for France) network. Can you please comment on the benefits of participation in the ISO standards-making process? What types of ISO standards are important for the building industry? How can ISO International Standards benefit the building industry and its customers and other stakeholders, such as regulators?*

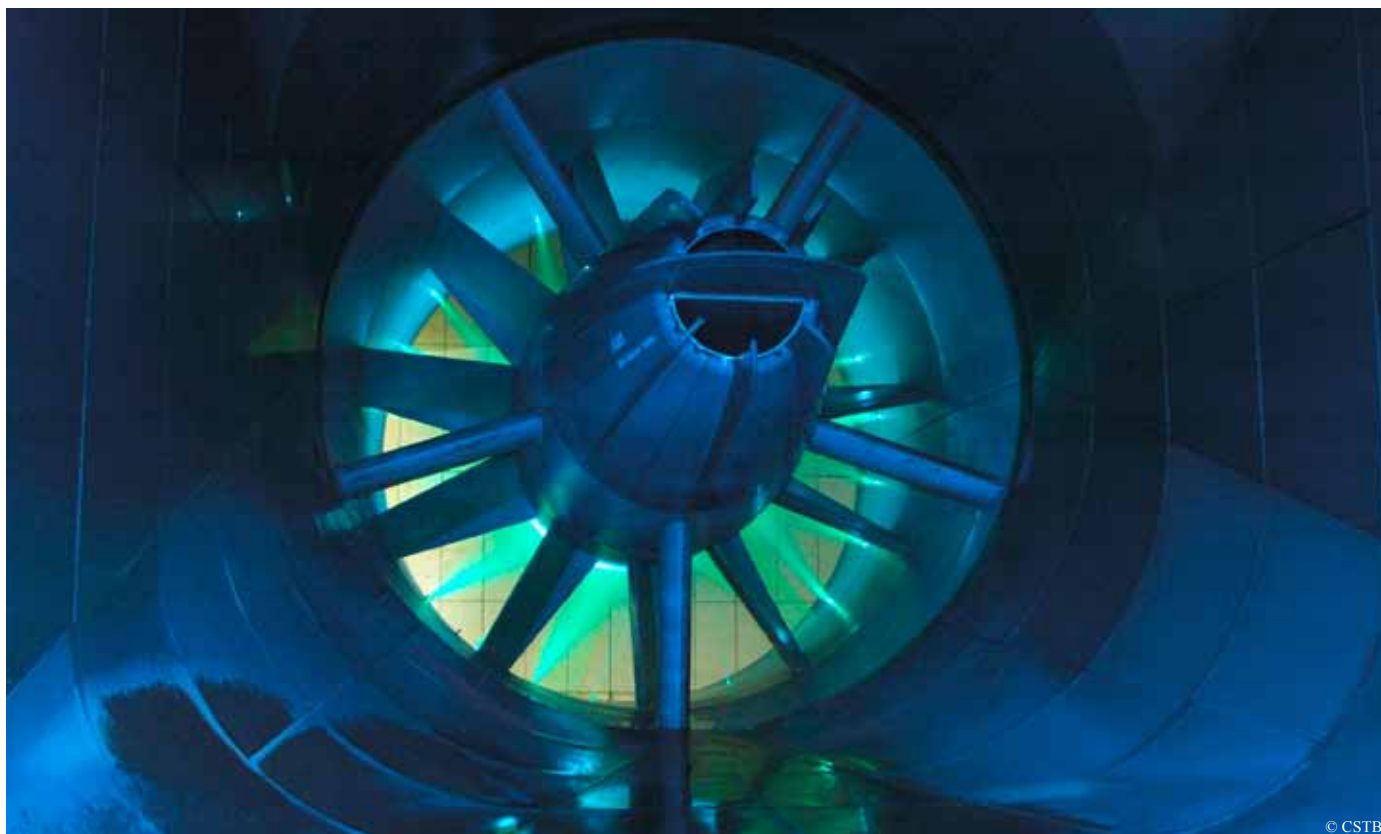
Ms. Le Gall: For a long time, the building industry was considered local, with few international challenges. After all, buildings don’t travel! But a lot of materials and equipment which make up buildings do move around. In order to describe the performances which need to be integrated into a project, International Standards are necessary.

People also move around and work internationally. They expect to be able to rely on International Standards for a certain level of comfort and safety.

Construction includes various industrial sectors and services which must work together.

Like many human activities, buildings, at the end of the day, have an impact on our planet. Their impact is significant, being one of the primary sources of usage of materials, as well as of energy, and notably electricity, and thus a prime factor in CO₂ emissions (40% globally).

Sustainable development has to take into account both local and international challenges. International Standards are a means



Climatic wind tunnel of CSTB in Nantes, France.



Performance testing on solar photovoltaic modules conducted by Certisolis, a subsidiary of CSTB-LNE (French Laboratory of Metrology and Testing).

of addressing these issues at a global level, disseminating best practice.

Participation in standards development ensures that all interests are taken into account, whether industry, regulators or consumers.

ISO Focus+: *The International Energy Agency released a publication that estimated that existing buildings are responsible for more than 40 % of the world's total primary energy consumption. Could you sum up how CSTB supports the building profession with environmental issues and the control of energy? How have ISO International Standards helped the industry become more energy efficient?*

Ms. Le Gall: France has become involved in a very ambitious programme of energy and environmental transition following a national consultation called the “Grenelle Environment Forum”.

CSTB has been very active in this process, reaching out to public authorities, businesses and NGOs in order to promote an improvement in building performance. A paradigm shift is indeed possible.

Buildings today consume a lot of energy and resources. But tomorrow they could become low consumers (“passive” or “bioclimatic” buildings) or even net producers of energy (“positive energy buildings”), while still offering their users as much, if not more, comfort and quality of life.

How? Firstly, by rethinking the location of a building in its environment with sustainable

cities in mind. Attention must also be paid to the design and choice of materials and equipment (bioclimatic architecture, renewable or recycled materials and renewable energy products). But in particular, through sustainable management, which will be able to rely on energy management methods, on calculation methods and doubtless on new service professions for maintenance, handling and good management of our needs.

ISO Focus+: *ISO 50001, on energy management systems, is coming up for publication. Has CSTB been following the development of this standard? What would you like to see ISO doing differently or in addition to benefit your industry sector even more?*

Ms. Le Gall: The future standard ISO 50001 was initially conceived for managing energy in industry, but its use could without doubt eventually be applicable to building management.

Construction is not a single industrial sector, but several. It brings together a number of industrial sectors (concrete, steel, timber, mechanics etc.) and services which have had to learn to work together.

I believe that the holistic approach of the construction “macro sector” has a lot to teach us. I also think that the construction macro sector will continue to innovate, above all because of the energy transition underway, but also via the development of electronic and IT tools which are pushing construction into the information and communication technology (ICT) realm via “virtual buildings” (BIM/Building Information Models).

Tomorrow's buildings could become low consumers or even net producers of energy.

My recommendation is therefore that ISO continues to develop the coordination of works between interdependent subjects (systemic approach), and continues to work closely with the International Electrotechnical Commission (IEC), and progressively develop links with software standardization. ■

About CSTB

Founded in 1947, CSTB is an independent public body in the building innovation industry. CSTB is active in four key areas – research, expertise, assessment and dissemination of knowledge – which enable it to respond to the sustainable development objectives for construction products, buildings and their integration into towns and districts. CSTB is a vital contributor to the quality and safety of sustainable construction thanks to the competencies of its 850 employees, its subsidiaries and its national, European and international partner networks.

CSTB aims to:

- Respond to sustainable development challenges through an integrated approach to construction addressing: environmental and energy performance, security, health and user and market needs
- Innovate in confidence: from the creation of a product or process, to best practice following implementation. Researchers, engineers, evaluation and certification experts help optimise and add value to research results
- Accompany all players in the construction industry through all aspects of the building process, from equipment, products and materials to construction works and their integration into neighbourhoods and cities.

CSTB
le futur en construction



Act now !

Creating a sustainable energy future

by Elizabeth Gasiorowski-Denis

According to the International Energy Agency (IEA), energy efficiency offers a powerful and cost-effective tool for achieving a sustainable energy future. Improvements in energy efficiency can reduce the need for investment in energy infrastructure, cut fuel costs, increase competitiveness and improve consumer welfare. Environmental benefits can also be achieved by the reduction of greenhouse gas emissions and local air pollution. Energy security can also benefit from improved energy efficiency by decreasing the reliance on imported fossil fuels.

But improving energy efficiency implies acting on the myriads of uses of energy and actors involved, from governments to consumers, from industry to transportation and buildings, from design of products and equipment to the design of networks and infrastructures. The necessary actions imply a mix of regulations, technology, economic incentives, communication and the promotion of good practices.

Research efforts by the World Economic Forum (WEF) have, for example, identified a role for International Standards in order to increase the scale of energy efficiency. In its recent publication, *Energy Efficiency: Accelerating the Agenda*, it states: "The challenge is that as demand increases and new technology comes online, energy efficiency goal posts need to keep moving – International Standards can help to support this movement."

Clearly, International Standards can and must help in this context. International Standards address many of the building blocks necessary to define, implement and monitor both macro and micro policies in this area, such as the harmonization of terms and definitions, the provision of metrics and test methods to assess, monitor

and communicate energy consumption, the modeling and comparison of energy systems or the characterization of materials and products, as well as of their production processes, from the standpoint of optimizing energy use, resulting in energy savings.

To this end, the May 2011 *ISO Focus+* issue will look at the theme of energy. This month's dossier hones in on what ISO is doing for energy efficiency, and why standards are first-rate tools to help meet the international clean energy and climate change challenges. It also analyses the different energy efficiency measures and assesses their effect on the environment.

The issue brings together a portfolio of articles from a diverse range of subjects: electric cars, energy efficiency of buildings, general energy terminology, the carbon footprint standard (the future ISO 14067) and energy management systems (the future ISO 50001). It also features a case study from the US Department of Energy (DoE) which has been supporting pilot implementation programmes by US industrial companies based on ISO 50001, *Energy management*, in order to encourage energy efficient manufacturing, and promote verifiable improvements in energy performance. Last, but not least, new committees dealing with energy-related issues created by ISO such as sustainability criteria for bioenergy, energy savings and energy efficiency of industrial furnaces are also featured.

With existing partnerships with the World Energy Council and the International Energy Agency (IEA), together with significant activity related to both the production and use of energy, ISO is paving the way for a sustainable energy future for all. ■

Elizabeth Gasiorowski-Denis is Editor, *ISO Focus+*.



ISO 50001

energy management



Energy excellence

In comes the ISO 50001 energy management system standard

by Edwin Piñero

With oil trading above USD 100 per barrel and climbing as unrest grows around the world, energy security is an overriding concern in the minds of citizens, politicians, and businesses. Energy touches all aspects of society and the effects of shortages can reverberate throughout economies and the daily lives of entire populations. Nearly all segments of society are involved in energy conservation, be it prudent consumption at home, governments setting policies and incentives, or businesses doing what they can to save money by saving energy.

Although the typical homeowner or business cannot control energy supplies, they can certainly decide how they use the energy that is available, and the most efficiently used energy is that which is not used at all.

Energy efficiency is often called the “forgotten fuel” because efficiency is sometimes ignored in discussions about alternative energy sources. Also, for the energy that must be used, selecting the right mix of alternative and renewable sources will help reduce dependence on scarce fossil fuels.

Action toward greater efficiency, commonly known as energy management, is a priority focus for many organizations because of the significant potential to save

energy and reduce greenhouse gas emissions. Reducing overall energy use, and especially fossil fuel consumption, means greater reliability and availability of energy and lower operating costs. More than just an environmental issue, energy management is equally an economic and social issue. In essence, energy management supports the three pillars of sustainability: economy, environment and society.

Tools, guidance and resources

The importance of energy management demands that tools, guidance and resources must be available to help organizations

effectively address the issue. These tools should include basic information on how to integrate energy management into the overall organizational management structure. But we live in a globalized economy, where markets transcend national boundaries and regulatory regimes. Tools and guidance will not come from national regulatory regimes, but from market-driven International Standards.

Standards are created by the very organizations that need to use them, and are created in an open, consensus-driven process. Standards are adaptable across various types of organizations and work smoothly across national borders. They establish a level playing field, reducing unfair advantages and inconsistent benchmarks.

Within this realm is the growing number of international management system standards designed as tools to improve organizational efficiency and productivity. Product standards have been with us for a very long time, but the relatively new field of International Standards for managing how an organization functions – as opposed to the nature of its products – is expanding rapidly.

Existing ISO standards for quality management practices (ISO 9000 series) and environmental management systems (ISO 14000 series) have successfully stimulated substantial, continual efficiency improvements within organizations around the globe.

Nearly all segments of society are involved in energy conservation.

Several countries and regions have developed or are developing their own management standards, including China, Ireland, Republic of Korea, the USA and the European Union with EN 16001, *Energy management systems*. On the international front, the UN Industrial Development Organization (UNIDO) has long recognized industry's need to mount an effective response to climate change and to the proliferation of national energy management standards, leading to a request that ISO consider undertaking work on an international energy management standard.

ISO had identified energy management as one of the top five fields for development of International Standards. Clearly, the first major users of such a standard would be industrial companies since industry is the single largest user of energy in the world.

Effective energy management in industry offers great potential for improvement, with expected long-term efficiency increases of 20% or more.¹⁾ With broad applicability across national economic sectors, this standard could influence up to 60% of the world's energy demand (see **box**). Although originally intended for industry, the standard will be usable by any type of organization wishing to effectively manage its energy uses and efficiency.

Evolution of ISO 50001

The journey toward an international management system standard for energy began with the initiation of work on ISO 50001, *Energy management*. In February 2008, the ISO Technical Management Board approved the establishment of a new project committee, ISO/PC 242, *Energy management*, building on the most advanced good

1) McKane, et al, 2007, UNIDO publication, *Policies for Promoting Industrial Energy Efficiency in Developing Countries and Transitional Economies*; v. 08-52434- April 2008.

practices and existing national or regional standards. ISO 50001 will establish an international framework for industrial and commercial facilities, or entire companies, to manage all aspects of energy, including procurement and use.

After only four committee meetings spanning a period of two years, the document is now at the Final Draft International Standard (FDIS) stage, with publication expected for third-quarter 2011. Many countries and organizations are already preparing training and rollout programmes to catapult ISO 50001 into the mainstream as quickly as possible. In addition, ideas for new work items and supporting standards and documents are already being developed.

Several factors are affecting the speed of the standard's development. One is the need to stem dependence on scarce fossil fuels; another is emergence of an ideal mix of experts and qualified stakeholders with the skills and passion needed to develop the document.

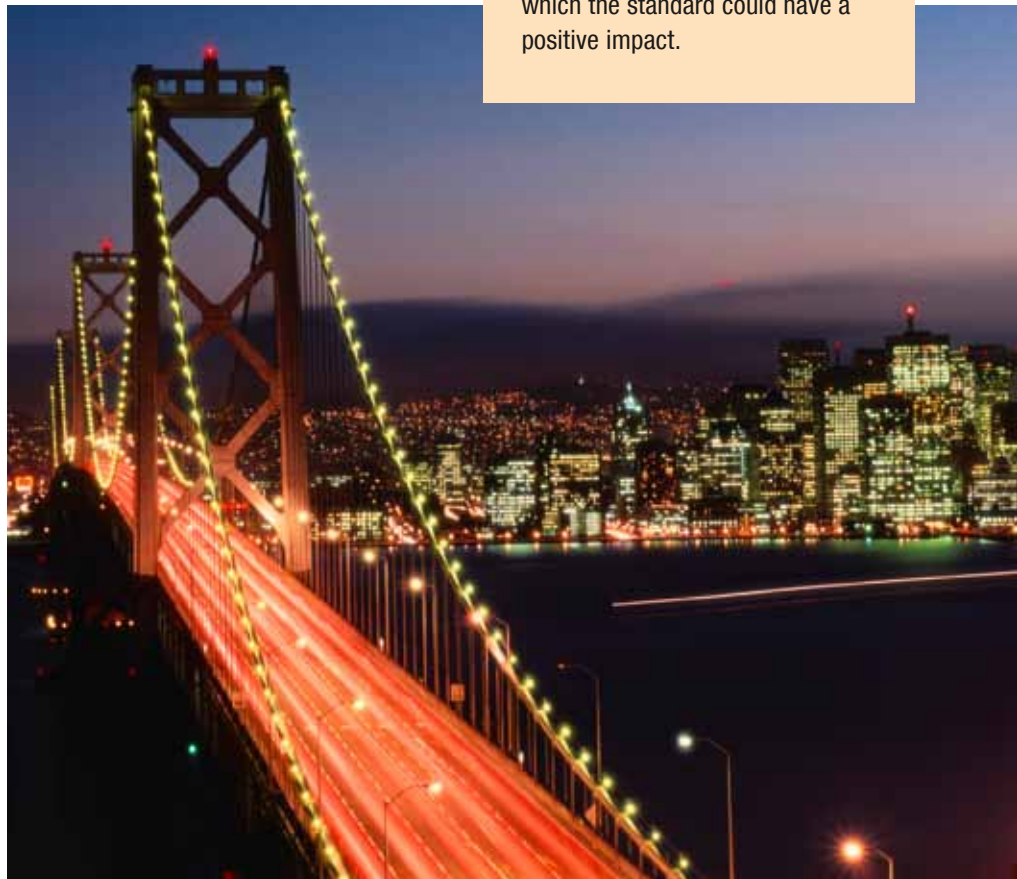
When the committee was created, the aggressive schedule calling for a final standard by 2011 seemed a nearly insurmountable task, especially considering the time periods required for balloting. However, the urgent need for an International Standard that would provide a management tool to deal with

ISO 50001 and global demand

ISO 50001 could influence up to 60 % of the world's energy demand.

The above estimate is based on information provided in the section, "World Energy Demand and Economic Outlook", in the *International Energy Outlook 2010*, published by the US Energy Information Administration. This cites 2007 figures on global energy consumption by sector, including 7% by the commercial sector (defined as businesses, institutions, and organizations that provide services), and 51% by the industrial sector (including manufacturing, agriculture, mining, and construction).

As ISO 50001 is primarily targeted at the commercial and industrial sectors, adding the above figures provides an approximate total of 60% of global energy demand on which the standard could have a positive impact.



critical energy issues while harmonizing the growing family of national standards has resulted in an admirably smooth and rapid development process.

How ISO 50001 will help

ISO 50001 will provide organizations and companies with technical and management strategies to increase energy efficiency, reduce costs, and improve environmental performance.

ISO 50001 will increase energy efficiency, reduce costs, and improve environmental performance.

The standard is intended to provide organizations and companies with a recognized framework for integrating energy efficiency into their management practices. Multinational organizations will have access to a single, harmonized standard for implementation across the organization with a logical and consistent methodology for identifying and implementing improvements. The standard is intended to accomplish the following:

- Assist organizations in making better use of their existing energy-consuming assets
- Offer guidance on benchmarking, measuring, documenting, and reporting energy intensity improvements and their projected reductions in greenhouse gas emissions
- Create transparency and facilitate communication on the management of energy resources
- Promote energy management best practices and reinforce good energy management behaviours
- Assist facilities in evaluating and prioritizing the implementation of new energy-efficient technologies
- Provide a framework for promoting energy efficiency throughout the supply chain
- Facilitate energy management improvements for greenhouse gas emission reduction projects
- Allow integration with other organization management systems such as environment and health & safety.



The future

It is hoped that the introduction of ISO 50001 will result in widespread adoption of the standard among all types of energy users. The Plan-Do-Check-Act model has proven successful for managing quality and environmental issues. Each new management system standard is an improvement over earlier ones based on lessons learned from the experiences of the predecessors.

ISO 50001 will help integrate performance measurement and data with the management system framework. So the driver of a successful energy management system will not only lead to effective management of the process, but also increased energy efficiency and more prudent energy use. As with other ISO management system standards, it is likely that there will be a process to certify the management system itself, as with ISO 9001 and ISO 14001. ■

About the author



Edwin Piñero is the Chief Sustainability Officer for Veolia Water North America, and leads Veolia Water's sustainability efforts in North America. He works to support programs in company

operations as well as develop and implement sustainable programmes and services for Veolia Water's clients. The company's North American operations serve more than 14 million people in approximately 650 communities. He has served as a consultant, as well as in the public sector at the State and Federal level, addressing sustainability issues. He served the White House Federal Environmental Executive where he focused on developing and implementing sustainability policy and practices within the Federal Government.

ISO 50001 pilot programme

US companies implement standard with government support

by Garry Lambert

The US Department of Energy (DoE) has been taking a close interest in the development of ISO 50001, *Energy management*, and has been supporting pilot implementation programmes by US industrial companies in order to encourage energy efficient manufacturing, and promote verifiable improvements in energy performance.

The progress of ISO 50001, *Energy management*, has been closely monitored by industry and by government departments responsible for energy worldwide. Targeting broad applicability across national economic sectors, it is estimated that the new International Standard could influence up to 60% of the world's energy use. ISO 50001 has been developed by ISO project committee ISO/PC 242, which has a four-way leadership comprising the ISO members for the USA (American National Standards Institute – ANSI); Brazil (Associação Brasileira de Normas Técnicas – ABNT); China (Standardization Administration of China – SAC), and the United Kingdom (British Standards Institution – BSI).

Forty-three ISO member countries have been participating in the work, with another 13 as observers. Liaison organizations include the United Nations Industrial Development Organization (UNIDO) and the World Energy Council (WEC).

ISO has identified energy management as a priority because of the significant potential to save energy and reduce greenhouse gas emissions that exists worldwide. ISO 50001 will establish a framework for

industrial plants, commercial facilities or entire organizations to manage energy.

ISO 50001 is based on the common elements found in all of ISO's management system standards, assuring a high level of compatibility with ISO 9001 (quality management) and ISO 14001 (environmental management).

US DoE supports ISO 50001

The US Department of Energy has been supporting the development and implementation of ISO 50001 in conjunction with the US Council for Energy Efficient Manufacturing (US CEEM). In turn, CEEM is leading the development of Superior Energy Performance (SEP) to help companies conform to the new energy management standard.

SEP is a certification programme that provides industrial facilities with a roadmap for achieving continual improvement in energy efficiency while maintaining, or boosting, competitiveness.

A central element is implementation of ISO 50001, with additional requirements to achieve and document energy performance improvements. SEP certification

requires passing an audit which assesses the conformity of the energy management system and verifies the claimed improvement in energy performance

*ISO has identified
energy management as
a priority.*

The DoE has announced the first industrial plants in the USA to be certified under the programme following training sessions designed to provide them with a blueprint for continual improvement in energy performance. Some 25 companies across 14 US states are taking part, seeking to learn more about developing and implementing an energy management system that meets the highest standards in energy efficiency.

Participating organizations receive tailored assistance from the DoE's Industrial Technologies Programme (ITP) support teams to implement an energy management system that will conform to ISO 50001. By meeting the requirements of the standard,



manufacturers will demonstrate their ability to manage their energy use better, improve energy performance, and apply an accredited methodology for measuring and verifying energy efficiency and energy intensity improvements.

The Georgia Institute of Technology is the technical lead for the DoE-ITP Energy Management Demonstration Programmes, including one underway for the Mid-Atlantic region which involves five local industrial companies. Penn State University provides the consultant team for two of the five participating companies in the Mid-Atlantic Demonstration.

Pyrex and ISO 50001

One of the companies taking part in the programme is World Kitchen LLC, of Rosemont, Illinois, USA, manufacturer of the world famous Pyrex brand glassware. World Kitchen's plant at Charleroi, Pennsylvania, is taking part in the Mid-Atlantic Demonstration. The objective is to reduce its "energy intensity" with the help of ISO 50001 and the support of consultants at Penn State University.

Energy intensity measures how much energy is used per unit of items produced.

"Energy intensity is different from energy use," explained Warren Weaver, Senior Sustainability Specialist in Penn State's technical assistance programme. "Energy intensity measures how much energy is used per unit of items produced."

The DoE awarded Penn State a USD 350 000 grant to provide consulting services for two years for World Kitchen and other companies seeking energy improvements, as part of its "Save Energy Now" (SEN) and SEP programmes. The government agency created the programmes after an analysis revealed that US factories can economically save more than 20% of total energy use across all factories in the country.

SEN takes a forward view and requires companies to commit to reduce their energy intensity by 25% over a 10-year period, while the SEP Programme calls upon an individual manufacturing facility to look backward and document at least a 5% energy performance improvement over a three-year period.

About World Kitchen and energy intensity*

The Pyrex production process at World Kitchen is energy intensive in its use of gas and electricity to mix, melt, form and heat-treat the glassware.

It is an old process, dating back to 1915 when a chemist at the Charleroi plant brought home a piece of glass for his wife to use to bake a sponge cake. The glass, made for railroad lanterns, worked so well in the hot oven that a new line of bake ware was launched, named after "pyro", the Greek word for fire.



Each piece of Pyrex glassware is inspected at the end of the manufacturing process at World Kitchen, one of the US industrial companies currently implementing ISO 50001 in a US DoE supported energy management programme.

Plant Manager Douglas Chamberlin explains that the production of Pyrex involves six steps – mixing, melting, forming, heat-treating, packing and shipping. In mixing, raw materials are dumped into two-ton bins, then transferred to a heat tank where five gas jets and 10 electrodes heat the glass to 1 400°C, essentially turning it into lava. The mixture exits the tank in large drops called gobs that fall into molds for forming.

In the forming step, some of the energy is taken out when a water-cooled plunger descends onto a gob to press it into the mould. Each piece then passes through a fire polish burner to smooth out rough edges. From there it goes through a kiln to the end of the line, where, if it passes inspection, it is packed for shipment.

The process takes about eight minutes from gob to box. Some 325 employees and 40 management personnel work in shifts to keep the plant going 24 hours a day, seven days a week, enabling World Kitchen to produce about 40 million pieces of Pyrex per year.

"We're pretty close to a zero-waste facility," says Mr. Chamberlin, commenting that any pieces failing inspection go back to square one, becoming raw material again.

*Adapted from an article by Elwin Green, first published in the Pittsburgh Post-Gazette on 1 December 2010.





The programme at World Kitchen, typical of other companies taking part, is in three phases – plan, do and check/act. The planning phase in July 2010 and doing phase in January 2011 took place in training sessions at Penn State and West Virginia Universities respectively.

For the check/act phase, World Kitchen is hosting a training session at its Charleroi manufacturing plant, starting in June 2011, focusing on ISO 50001 implementation.

Pioneering ISO 50001 implementation

ISO Focus+ asked Holly Grell-Lawe, Principal Research Associate at Georgia Institute of Technology, Douglas Chamberlin, Plant Manager at World Kitchen, and Paul Scheihing, Acting Supervisor, Technical Assistance, Industrial Technologies



The glass furnace at World Kitchen uses gas oxygen burners and an electric boost to melt the raw glass to 1 400°C, seen here floating under the gas burners on the far side of the tank.

Programme (ITP) at the US DoE, to comment on implementation of ISO 50001, and the influence the new International Standard is expected to have on energy management.

“Georgia Tech is the Technical Lead for the DoE-ITP Energy Management Demonstration Programmes. I am assigned to the Mid-Atlantic region which involves five local industrial companies, including World Kitchen,” said Holly Grell-Lawe. “Along with the other industrial companies, World Kitchen has committed to achieving

certification to the SEP programme which requires implementation of ISO 50001 and demonstration of verifiable energy performance improvement.”

“We conduct ISO 50001 implementation training and also mentor and assist the consultant teams responsible for working one-on-one with their assigned companies to implement the standard and SEP requirements.”

Georgia Tech has been closely involved in the development of ISO 50001, with



Energy intensive reheater burners keep process equipment hot to avoid inducing a temperature shock in the glassware.



Douglas Chamberlin, of World Kitchen, which has been implementing ISO 50001 even in draft stages of the standard's development.

representatives participating in the US Technical Advisory Group (US TAG or "mirror committee") to ISO/PC 242, and as US/ANSI delegates to the international meetings of ISO/PC 242.

The US DoE has also been involved in the development of ISO 50001 through the US TAG, and as a member of the ANSI delegation to ISO/PC 242 meetings.

"An existing management system based on the Plan-Do-Check-Act model (such as

ISO 9001, ISO 14001, ISO 22000, etc.) was a pre-requisite for companies applying for participation in the Southeast, Mid-Atlantic and Mid-West Energy Management Demonstrations," added Holly Grell-Lawe. "The management system had to be fully implemented, although third-party certification to these or related standards was not a requirement."

Understanding energy usage

Douglas Chamberlin, of World Kitchen, commented on the role his company is taking in energy management.

The SEP programme includes conformity to ISO 50001.

"We worked with the DoE back in 2006 on the "Save Energy Now" initiatives regarding process heat reduction. World Kitchen was previously ISO 9001 certified and currently works under a High Performance Work System for its quality systems. The effort will permit us to truly understand our energy usage and requirements, and permit us to focus on ways to reduce energy consumption by either looking at process changes or equipment/process improvements to our operations," he said.



Paul Scheihing, Acting Supervisor, Technical Assistance, Industrial Technologies Programme at the US DoE.

Influencing world energy demand

ISO Focus+ asked Paul Scheihing of the US DoE for his opinion of the effect that the DoE's energy programmes, and implementation of ISO 50001, are likely to have on energy saving.

"The industrial and commercial sectors present significant opportunities to improve the efficiency of their operations," he replied. "The Superior Energy Performance is expected to serve as a foundational programme through which supply chains, utilities, and government agencies can reward excellence in energy management that includes third-party verified energy savings. While DoE along with US CEEM is guiding the development of the programme, once underway, it is intended to become self-sustaining through plant certification fees.

"The programme is designed to encourage a shift in how energy is managed at the facility level by providing companies and staff with a roadmap toward ongoing energy management improvement, thus helping companies to save money, save energy, and improve their competitiveness. Based on broad applicability across national economic sectors, the ISO 50001 standard could eventually influence up to 60% of the world's energy demand," he concluded. ■

Garry Lambert is a British freelance journalist based in Geneva, Switzerland.



A Pyrex product passes underneath a fire polish burner which removes any sharp edges.



On common ground

ISO/IEC take on terminology

by Hervé Lefebvre

In recent years, energy efficiency improvement has moved to the top of the policy agenda for international platforms such as the G8 forum of the world's largest economies, the International Energy Agency (IEA) and others. This shift clearly indicates the key role played by energy policy in enhancing national security, averting the threat of global warming and promoting economic development and innovation.

The common view holds that increased use of renewable energy sources, in parallel with energy efficiency initiatives, will strengthen national economies and put countries on the path toward meeting commitments to decrease greenhouse gas emissions.

In December 2009, the United Nations Climate Change Conference resulted in adoption of the Copenhagen Agreement, which, for the first time in history, sets the objective of limiting the rise in global temperatures to 2° Celsius. UN member countries recognize the need for common measurement tools and rigorous, transparent methodology.

New energy-related legal requirements, innovation, technological solutions, practices and competencies are currently implemented in the global marketplace by a wide variety of stakeholders, including government, industry, energy producers, service providers, academics and researchers, standardization bodies, consumer interest groups and environmental organizations.

Definitions for core concepts

The involvement of such a wide variety of sometimes competing interests makes it essential to agree on terms and definitions for high-level core concepts regarding energy efficiency and renewable sources. These terms and definitions will be the basis for a common language for regulations, standards, technologies, research, training and trade in the highly innovative field of energy efficiency and renewable energy sources.

These goals require a set of agreed terms and definitions for priority concepts in order to:

- Establish common understanding among international stakeholders of cross-cutting concepts that are vital to the future development of tools and methods. Terminology must cross diverse sector lines: energy, industry, construction, transportation, environment, services, teaching, research
- Facilitate development of regional and national regulations and incentive programs to promote energy efficiency and the use of renewable energy sources
- Contribute to the use of standards by facilitating their development and furthering users' understanding and application of standards
- Reinforce business competitiveness with recognized terms and definitions

that facilitate the relationship between providers and clients by clarifying expectations related to procurement, contracts and services, as well as corporate reporting on energy management action plans and roadmaps.

In 2009, ISO and the International Electrotechnical Commission (IEC) created joint project committee ISO/IEC JPC 2, *Energy efficiency and renewable energy sources – Common terminology*, whose primary objective is to develop a standard that will identify cross-cutting concepts with terms and definitions associated with energy efficiency and renewable energy sources while taking into account terminology that has already been elaborated in sector-specific ISO and IEC technical committees.

The French national standardization body, AFNOR, manages the ISO/IEC JPC 2 secretariat, while the committee is chaired by Hervé Lefebvre, head of the Climate Division of the French Environment and Energy Management Agency (ADEME).

Three working groups (WG) were established at the first meeting of ISO/IEC JPC 2 in January 2010:

- WG 1, *Energy efficiency: Concepts and diagrams*, coordinated by ANSI (USA)
- WG 2, *Inputs from existing reference documents*, coordinated by SIS/SEK (Sweden)
- WG 3, *Renewable energy sources – Terms and definitions*, coordinated by AFNOR (France).



Growing membership

Since that first meeting, membership in the committee has grown from 20 to 22: Argentina, Austria, Brazil, Canada, China, Egypt, Finland, France, Germany, Italy, Republic of Korea, Mexico, The Netherlands, Norway, Pakistan, Russia, South Africa, Spain, Sweden, the USA, the United Kingdom, and Uruguay. In addition, 20 countries act as observers. ISO/IEC JPC 2 has resolved to draft the standard in English and French.

Energy efficiency improvement has moved to the top of the policy agenda.

Adhering to ISO 10241:2011, *International terminology standards – Preparation and layout*, JPC 2 first established a list of reference documents as a basis for the work on terminology. This work was done mainly by WG 2, which has systematically screened existing IEC and ISO standards and other international reference documents to provide input to the work of WG 1 and WG 3. Meanwhile, WG 1 and WG 3 developed a preliminary list of identified terms and concepts for the field of energy efficiency and renewable energy sources.

As a second step, ISO/IEC JPC 2 has clearly established user target groups for the future standard.

- Standards writers, who need a common tool for existing technical committees (TCs) and project committees (PCs) dealing with energy efficiency and renewable energy core concepts, and specifically for ISO/PC 242,

developing ISO 50001:2011, *Energy management systems – Requirements with guidance for use*, ISO/PC 248, *Sustainability criteria for bioenergy*, and newly created TCs and PCs such as ISO/TC 257, *Energy savings* and ISO/TC 255, *Biogas*. These committees must have a common lexicon on cross-cutting concepts to enable coherent development of standards.

- Standards users, including suppliers, academic institutions, policy makers and organizations seeking to improve energy efficiency and expand the use of renewables.

The third step, agreeing on a preliminary list of terms and concepts, took place at a meeting in Atlanta, GA, USA in early March. Upcoming work will focus on the grouping and structuring of concept systems as outlined in ISO 704:2009, *Terminology work – Principles and methods*, and later to develop precise definitions.

The Committee Draft (CD) step will be launched after the next ISO/IEC JPC 2 meeting, scheduled for September 2011 in Stockholm, Sweden. Publication of the ISO standard is planned for January 2014. ■

About the author



Hervé Lefebvre is head of the Climate Division for the French National Energy Agency (ADEME). He is Chair of ISO/IEC JPC 2, *Energy efficiency and renewable energy sources – Common terminology*.

and renewable energy sources – Common terminology.

Fuelling bioenergy

International Standards to help develop new global markets



by Birger Kerckow and Cláudio Guerreiro

While the use of bioenergy and biofuels is growing, these alternative energy sources consume only a minor share of agricultural crops and forestry production, and they still account for a tiny proportion of total energy supply. Only around 2% of the world's arable land is dedicated to energy crops and, for example, just 5% of total global production of palm oil is sold for the energy market, with the vast bulk grown for use in foodstuffs.

On the user side, biofuels represent about 3% of global road transport energy consumption, although the importance of this category is expected to increase in coming years. The International Energy Agency (IEA) projects an increase in demand for primary energy from biomass of up to 750 million tonnes oil equivalent by 2035, as compared to 2008 figures (*World Energy Outlook 2010*).

Several countries/regions have set ambitious targets for bioenergy and biofuels in the next decade. For example, the European Union's goal of 10% renewable energy in transportation will be met primarily by biofuels. With higher volumes, there will inevitably also be increasing discrepancies

between supply and demand, leading to more international trade in the future.

Mitigating climate change and improving energy supply security are key drivers for bioenergy. Under current economic conditions, markets depend on political support, and this can only be justified with assurances of improved sustainability.

Proof of sustainability in its three dimensions – environmental, social and economic – is also key for market actors in this emerging sector, as they have to be confident that their investments are long-lasting and economically sound. The public debate on bioenergy is a lively one – with food versus fuel conflicts, destruction of rain forests and poor greenhouse gas balances being the main arguments against bioenergy and biofuels.

Levelling the playing field

In 2010, nearly 70 bioenergy sustainability initiatives, systems and regulations were counted in an article appearing in the journal *Renewable and Sustainable Energy Review* (J. van Dam, et al, "From the global efforts on certification of bioenergy towards an integrated approach based on sustainable land use planning"). Does this mean there is no need for an ISO standard?

Mitigating climate change and improving energy supply security are key drivers for bioenergy.

ISO is in a unique position, as it provides a level playing field for all countries and stakeholders. Although demand for bioenergy – and especially for biofuels – is most dynamic in industrialized countries such as the USA or in regions such as the European Union, developing countries have an important role as suppliers of biomass.

International Standards provide crucial tools for the development of new global markets. ISO standardization is an established



Objectives and rules for the future ISO 13065

Seven *objectives* provide a framework for development of the standard :

1. Compliance with national and/or regional legislation
2. Respect for the UN Universal Declaration of Human Rights
3. Rational and sustainable use of natural resources
4. Production and use of bioenergy should be sustainable in relation to biological diversity
5. Reduction of greenhouse gas emissions in relation to the fossil energy source replaced
6. Promotion of economic and social development in areas where bioenergy is produced and consumed
7. Bioenergy production should be economically and financially viable over the long term.

Seven *rules* will guide the development of the standard :

1. Principles, criteria and indicators shall be relevant to all economic operators
2. The committee will identify or develop criteria and methodologies, but will not set threshold values or limits
3. The committee will use a science-based approach that can be translated into measurable results
4. Principles, criteria and indicators should facilitate comparison of various energy options
5. Compliance with principles, criteria and indicators shall not be an undue administrative burden for society or the economic operator
6. The standard development process shall ensure that flexibility and transparency are built into all sections of the standard
7. Principles, criteria and indicators should be applicable across all forms of bioenergy.

and widely recognized process that enjoys an excellent reputation. The decision to develop the standard responds to growing international interest in bioenergy, and the current lack of globally harmonized sustainability criteria.

*Developing countries
have an important role
as suppliers of biomass.*

Under an initiative led by Brazil and Germany, ISO Technical Management Board (TMB) established a new project committee ISO/PC 248, *Sustainability criteria for bioenergy*. Some 35 countries are involved in its work either as participants or observers, including large markets such as China and the USA. ISO members for Brazil (ABNT) and Germany (DIN) provide the secretariat and leadership of the committee under a twinned arrangement.

ISO/PC 248, *Sustainability criteria for bioenergy*, brings together international expertise and recognized best practices in the use of bioenergy. The committee addresses the social, economic and environmental aspects of production and supply chains with the aim of avoiding environmentally or socially destructive practices.

Meeting of the minds

The first meeting of ISO/PC 248 took place in April 2010 in Rio de Janeiro, Brazil. Several issues were dealt with, including the



objectives, rules and guiding principles for the development of the future ISO 13065 (see **Box**), and a draft project plan. It also divided the initial structure of the committee into four working groups (WG):

- WG 1, *Cross-topic issues (including terminology, verification and auditing)*
- WG 2, *Greenhouse gases*
- WG 3, *Environmental, economic and social aspects*
- WG 4, *Indirect effects.*

The challenges in this interdisciplinary and highly political field are difficult, but the working groups have made good progress in the past 12 months. The committee is also looking at ways to encourage the participation of developing countries which have an important role in the biomass sector.

International Standards provide crucial tools for the development of new global markets.

The second meeting, scheduled for May 2011 in Frankfurt, Germany, will include a debate on comments received regarding the first Working Draft, and will aim for consensus on the document's initial content.

The future ISO 13065 standard is expected to be published by April 2014 and will serve a key tool in helping governments to meet their alternative fuel targets. It will not be a management system



standard and will neither replace national legislation nor certification systems on sustainability. It will, however, provide a transparent basis for all market actors to comply with legal requirements, helping to avoid technical barriers to trade on bioenergy.

As an International Standard, ISO 13065 will also help disseminate technical know-how

and stimulate the pursuit of quality through incentives for continued research.

In addition to tackling social and environmental issues, the standard will benefit both national and international markets by making bioenergy more competitive. ISO 13065 will be particularly valuable in helping producers in developing countries to compete. ■



About the authors



Birger Kerckow, Co-Chair of ISO/PC 248, heads the team for European and international cooperation at the German Agency for Renewable Resources (*Fachagentur Nachhaltende Rohstoffe e.V. FNR*). Mr. Kerckow has worked with renewable biological resources for industry and energy for more than 20 years.



Cláudio Guerreiro is the Manager of the International Standardization area of the Standardization Directory of the Brazilian Association of Technical Standards (ABNT), which hosts the Co-Secretariat of ISO/PC 248. He has worked in standardization for more than 10 years, mainly on the relationships between regional and international activities.

How much is too much?

Saving energy the smart way

by Li Tienan and Li Pengcheng

In 2007, ISO and the International Energy Agency (IEA) recognized the need for an International Standard to promote energy efficiency and a shift to renewable sources. The two organizations agreed that the new standard should specify harmonized terminology and calculation methods for energy efficiency, consumption and savings, as well as methods and criteria to calculate energy yield of various primary energy sources.

In September 2010, the ISO Technical Management Board approved the creation of ISO technical committee ISO/TC 257, *Energy savings*, to develop the ISO standard.

The first fuel

The significance of energy efficiency is widely recognized today, as the entire world is challenged by both climate change and concerns over energy security. Efficiency implies inherent environmental benefits from reductions in greenhouse gas emissions and local pollution, while energy security gains arise from decreased reliance on fossil fuels.

Reducing consumption of fossil energy resources through conservation plays an important role in improving energy efficiency. These savings can reduce the need for investments in energy infrastructure, cut fuel costs, increase competitiveness and improve consumer welfare.

Although a substantial amount of money is invested in the development and application of improved energy efficiency, there is still not enough concrete awareness of potential cost savings, and incomplete information on energy performance weakens the effectiveness of the measures taken. Lack of comparability of energy savings thwarts market-oriented savings mechanisms and increases the cost of energy efficiency.

International Standards are recognized as efficient tools to reduce uncertainty for all economic players. Technical consensus supports international trade and the development of new markets. Standards are also valuable in improving consumer understanding and confidence, which influences behaviour and choices.

Technical standards to evaluate energy savings are not limited to the measurement of performance metrics; parallel to

ISO 50001, other standards in the field help in monitoring, identifying and verifying energy savings delivered via a range of programs. The adoption of these broader standards contributes to the development of more fungible and international energy-efficiency markets, bringing us closer to the day when energy savings can be bought and sold as commodities in the same way electricity and gas are currently traded.

Growing in popularity

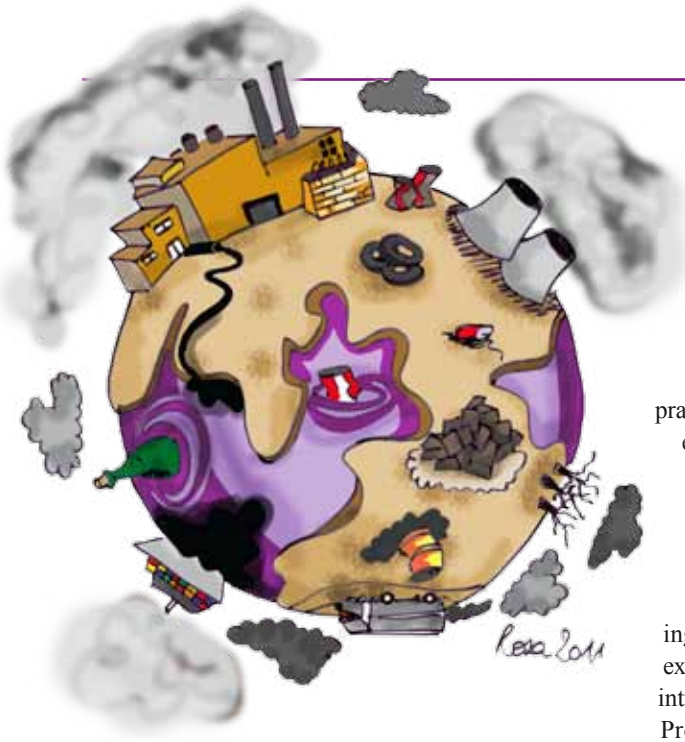
The standardization of energy savings is actually not an entirely new field, but has been carried out globally for two decades.

As part of its national energy conservation plan, China has worked since the 1990s to develop and revise its national standards GB/T 13234, *Method of calculating energy saved for enterprises* (first published in 1991), and GB/T 13471s, *Methods for calculating and evaluating the economic value of electricity saving measures* (first published in 1992).

The US Department of Energy (DOE) began working with industry in early 1994 to develop a consensus approach to measuring and verifying efficiency investments with the aim of overcoming existing barriers to efficiency.

The North American Measurement and Verification Protocol (NEMVP) was





published in 1996. The second version of the protocol renamed the International Performance Measurement and Verification Protocol (IPMVP), was published in 1997. A growing number of energy efficiency services companies are adopting the IPMVP, which is maintained by the Efficiency Valuation Organization (EVO) to measure and verify energy savings.

In Europe, the European Union's Energy End-use Efficiency and Energy Services Directive (2006/32/EC) calls for the development of harmonized measurement and verification methods for energy savings. South Africa has also taken steps toward development of a national standard for measurement and verification of energy savings.

Internationally, the IEA has plans to evaluate energy savings policies worldwide. However, specific ISO standards on determination of savings from energy efficiency measures are not yet available.

The main purpose of the new standards being developed by ISO/TC 257 is to facilitate the harmonization of national standards, specifications and requirements for determination of energy savings. Building on international practices and experiences, the upcoming ISO standards will target different levels, such as project level, enterprise level and regional level.

The essential terminologies, technical rules, methodologies, tools and guidance for measurement, calculation and verification of energy savings may be addressed in different standards. The main work of these standards will be divided into main four categories, including principles, requirements, guidelines, energy efficiency services and programmes.

Harmonization of innovation

Energy savings amounts to avoided energy consumption, which means that it cannot be directly measured in practice – a measured difference in energy consumption is often not a real energy savings because underlying conditions may have changed. It is usually necessary to calibrate inputs to determine real energy savings, and multiple methods (for example benchmarking) have been introduced to deal with this issue.

Problems arise in evaluation of energy efficiency measures due to different methodologies in the calculation and evaluation methods used internationally. Many countries experience considerable difficulty in evaluating energy efficiency activities because of a lack of relevant International Standards.

Energy savings amounts to avoided energy consumption.

There should be discussion in ISO/TC 257 aimed at solving these problems. Transverse rules must be robust in relation to existing innovations in different countries and different fields if the new International Standards are to succeed.

The first plenary meeting of ISO/TC 257, to be held from 31 May to 1 June 2011 in

Beijing, China, will focus on the scope and details of the technical committee's working programme and roadmap of related standards development. This meeting could be a milestone in international efforts to harmonize standards for energy savings.

Multitude of benefits

Because the proposed standard covers both producers and users of energy resources, their beneficiaries will be highly diverse. The new standards will help avoid technical barriers to trade while stimulating the market for energy efficiency services providers, most of which are small- and medium-sized enterprises.

The standards will make efficiency measures more reliable and competitive in energy management and public administration. They will also reduce technical barriers in energy savings trade and, hopefully, ignite a flourishing market.

Several advantages may be achieved by developing International Standards on energy savings:

- Encouragement of new energy efficiency projects and policy instruments
- Facilitation of access to new energy savings markets
- Increased awareness of energy efficiency measures among providers and users
- Acceptance of energy efficiency products with high added value
- Innovation of in saving mechanisms in both developed and developing countries
- Solid support for greenhouse gas emission reductions. ■

About the authors



Dr. Prof. Li Tienan, Deputy Manager-general of China Quality Mark Certification Group (CQM), has more than 25 years' experience in International Standards, including a key role in the intro-

duction of ISO 9000 in China. He manages a series of products certification programmes for CQM on conformity, energy efficiency, water conservation, environmental protection and safety, and he serves as Chair of ISO technical committee ISO/TC 257, *Energy savings*.



Li Pengcheng, an engineer in the China National Institute of Standardization, has extensive experience in standardization

of energy efficiency for energy-using products, energy efficiency services and measurement and verification of energy savings. He is Secretary of ISO technical committee ISO/TC 257, *Energy savings*.

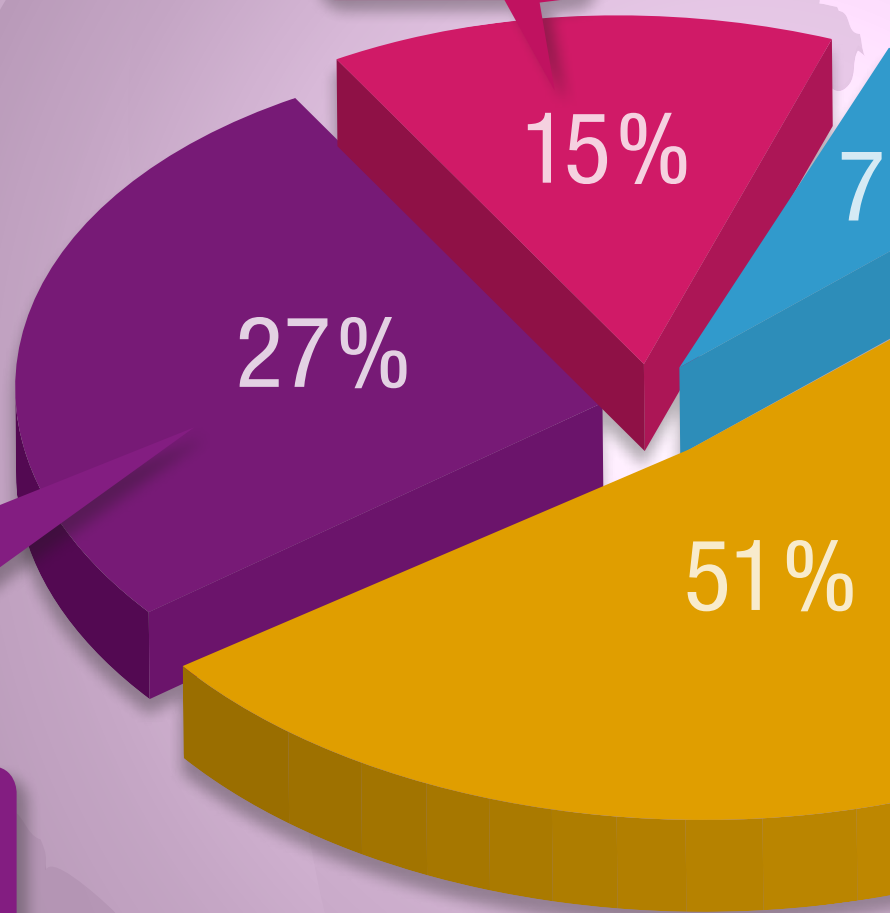
World energy use

Total world consumption of marketed energy is projected to increase by 49% from 2007 to 2035.

Residential sector Households



Transportation sector Moving people and goods by road, rail, air, water



Source: "World Energy Demand and Economic Outlook", in the *International Energy Outlook 2010*, published by the US Energy Information Administration. This cites 2007 figures on global energy consumption by sector.

ISO

standards that can help

Commercial sector

Service providers
– businesses
and institutions



ISO 50001 on energy management systems

ISO/IEC 13273 on common terminology for energy efficiency and renewable energy sources

ISO 13065 on sustainability criteria for biofuels

ISO/TC 257* on energy savings

ISO 16344 on overall energy performance rating and certification of buildings

ISO 16343 on expressing energy performance and for energy certification of buildings

ISO 16346 on the assessment of overall building energy performance

ISO 12655 on presentation of measured energy use of buildings

ISO 14067 on carbon footprint of products

ISO 14044 on environmental management life cycle assessment

ISO 14025 on environmental labels and declarations

ISO 13579 on measuring energy balance and calculating efficiency

ISO 6469 series on safety requirements of electric vehicles.

More information : www.iso.org

Industrial sector

Manufacturing, agriculture,
mining, and construction
– and for a wide range
of activities, such as
processing and assembly,
lighting



* TC : Technical Committee



Future cities

Building on energy efficiency



by Dick (H.A.L.) van Dijk and Essam E. Khalil

Energy consumption in buildings – including climate control, appliances, lighting and other installed equipment – represents nearly 40 % of the world's total energy use. There are many ways to reduce these energy requirements, and the potential savings from energy efficiency in the building sector would contribute substantially to a worldwide reduction in energy consumption.

But the lack of internationally agreed terms, definitions and procedures makes it very difficult to compare minimum energy performance requirements between countries, or to understand and compare data gathered on measured energy use of buildings.

This is why we urgently need a coherent set of International Standards for assessment and calculation, rating, labelling and best practices. Such standards would enable meaningful comparisons of actual energy use, and of the potential for novel energy savings and renewable energy technologies on a global scale. They would also facilitate the market for services related to energy use in buildings.

ISO technical committees ISO/TC 163, *Thermal performance and energy use in the built environment*, and ISO/TC 205, *Building*

environment design, have established a joint working group (JWG) to respond to the need for improved building energy standards: ISO/TC 163/WG 4, *Energy performance of buildings using the holistic approach*.

Energy consumption in buildings represents nearly 40 % of the world's total energy use.

The JWG's task is to ensure maximum consistency among standards and new or existing work items from both committees concerning energy efficiency and energy performance of buildings, including technical systems.

In addition, the JWG is to prepare proposals for the development of an ISO vision on energy performance of buildings for discussion in relevant technical and higher-level ISO committees.

Experts from 17 countries are currently active in the JWG.



Think pyramids

The assessment of the overall energy performance of a building, including technical systems, comprises a number of successive steps, which can be schematically visualized as a pyramid.

From top to bottom, each segment requires input from the segment below:

Segment 1: The top segment of the pyramid is the main output: the energy performance of the building.

Segment 2: One or more numerical indicators expressing the energy performance (such as overall energy use per square metre conditioned floor area, EP), a classification and ways to express the minimum energy performance requirements (EP_{max}).

Segment 3: The principles and procedures on the weighting of different energy carriers (such as electricity, gas, oil or wood) when they are aggregated to overall amount of delivered (and exported) energy. For instance, this may be expressed as total primary energy (E_p) or carbon dioxide emission (E_{CO_2}).

Segment 4: The categorization of building types (for example, office spaces, residential or retail) and specification of the boundaries of the building.

Segment 5: Procedures on the breakdown of the building energy needs and system energy losses, aimed at

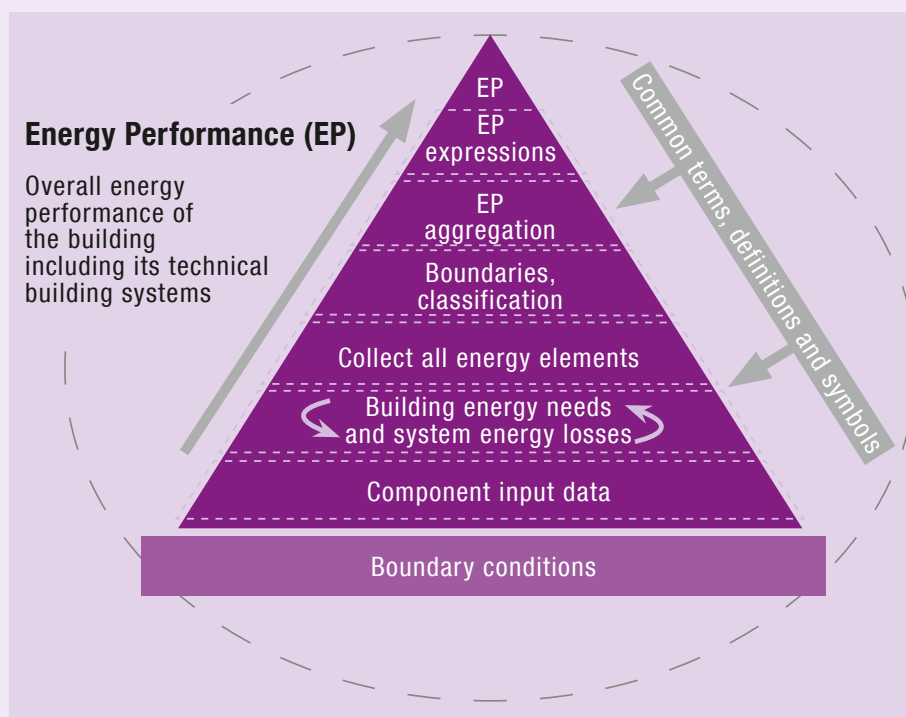


Figure 1: Overall building energy performance.

gaining clear insights into where energy is used.

Segment 6: The building energy needs and energy use for each application (heating, cooling, etc.) and interactions between them.

Segment 7: The input data on components, such as thermal transmission properties, air infiltration, solar properties of windows, energy performance of system components and efficiency of lighting.

The standards on boundary conditions comprise external climatic conditions, indoor environment conditions (thermal and visual comfort, indoor air quality, etc.), standard operating assumptions (occupation) and national legal restrictions.

Sets of common terms, definitions and symbols are essential for all segments from top to bottom. These cover terms such as energy needs, technical building systems, auxiliary energy use, recoverable system losses, primary energy and renewable energy.

Performance requirements and classification

Two prime applications of these standards are:

- Judging compliance with building regulations expressed as a limitation on primary energy or a related quantity
- Transparency in commercial operations through the energy certification and/or display of a level of energy performance.

This requires transparent, verifiable, unambiguous, robust and reproducible procedures. Evidently, this should be formulated to allow handling national differences in climate, culture and building tradition, building typologies, occupant behaviour, and policy and legal frameworks, including building regulations.

Work programme

The JWG currently has three active work items in the top segments of the pyramid. The first is ISO 16344, *Energy performance of buildings – Common terms, definitions and symbols for the overall energy performance rating and certification*. Its aim is not to produce general terms and definitions used in building design, but to produce common terms, definitions and symbols that are essential for the unambiguous and transparent assessment of the energy performance, from top to bottom of the pyramid. Considering the use of terms, definitions and symbols in various standards under ISO/TC 163 and ISO/TC 205, the document will first be advanced as a technical report (TR).¹⁾

The second work item is ISO 16343, *Energy performance of buildings – Methods*

for expressing energy performance and for energy certification of buildings. It covers Segment 2 of the pyramid.²⁾

Last, but not least, ISO 16346, *Energy performance of buildings – Assessment of overall energy performance*, is the third work item and covers Segments 3, 4 and 5 of the pyramid.³⁾

A spin off from these key energy performance items is the work item ISO 12655, *Presentation of measured energy use of buildings*. Its intent is to provide a methodology that will serve as a common basis to unify the collected data of measured building energy use and, in so doing, enable parallel

1) The relevant parts of the European Committee for Standardization (CEN) technical report EN/TR 15615 are used as starting point.

2) EN 15217 is used as a starting point.

3) EN 15603 is used as a starting point.

United for one cause



Managing greenhouse gas emissions in the supply chain



by Klaus Radunsky

Life cycle assessment (LCA) of greenhouse gas emissions throughout the supply chain is key to sustainable procurement. Leading countries in the field include Japan, Malaysia, Republic of Korea, Thailand, Sweden and the USA.

An information session hosted by the World Trade Organization (WTO) on product carbon footprints in February 2010 included presentations on three related standardization realms:

- British Standards Institution's BSI/PAS 2050:2008, *Specification for the assessment of the life cycle greenhouse gas emissions of goods and services*
- World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD)'s Greenhouse Gas Protocol Product Life Cycle Accounting and Reporting Standard (WRI/WBCSD GHG Protocol)
- The future ISO 14067 standard on the carbon footprint of products.

One of the important messages to emerge from the session was that these standards will support the WTO mandate of facilitating international trade. Harmonization of the standards' requirements will be key to ensuring a trade-friendly standards regime.

The number of companies prepared to estimate their carbon footprints is growing, as reflected in the successful "road testing" exercises organized by WRI and WBCSD from January to June 2010. Forty-two companies representing various sectors and located in 17 countries participated in that exercise, contributing to the finalization of the WRI/WBCSD's GHG Protocol.

The companies that road tested the draft standard reported they had little difficulty completing inventories in conformance with the requirements, and that the guidance provided in the draft was helpful.

Life cycle assessment

The British Standards Institution (BSI), ISO member for the United Kingdom (UK), conducted a survey in September 2010 to gather feedback from those who had downloaded BSI/PAS 2050. Aimed at informing upcoming revisions of the standard, the survey was completed by 1 018 respondents in the UK and around the world, representing organizations of all sizes. The survey revealed the following:

- The majority of companies reported that the standard helped to achieve a better understanding of organizational processes
- More than 40% claimed to have achieved a reduction in greenhouse gas emissions

- 32% cited achievement of cost savings and efficiencies.

Leading companies such as Volkswagen, Sony Ericsson, Nokia, Unilever, Philips and Timberland use advanced design tools to limit the carbon footprint of products under development. LCA Sustainable Product Design Europe, held in London in December 2010, examined strategies from these pioneers to cost-effectively incorporate life cycle thinking and sustainability into product design. The presentations showed that carbon footprint is a key parameter in designing new products.



Quantification and guidance

Development of ISO 14067 continues apace. Quantification requirements are maturing, and have already informed internal guidance documents for the American retailer Wal-Mart and other companies. The standard will provide much more specific guidance than the underlying ISO 14044:2006, *Environmental management – Life cycle assessment – Requirements and guidelines*. However, the standard avoids excessively prescriptive language in order to effectively support carbon footprint measurement for all products and services.

ISO 14067 calls for specific product category rules, including not only the specifications of ISO 14025:2006, *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*, but also other sector-specific

standards or internationally agreed guidance documents related to materials and product categories.

The standard also offers a range of communication options, including carbon footprint declarations, claims, labels, reporting and performance tracking. The requirements on verification and the need for specific product category rules are partly dependent upon whether the communication is business-to-business or business-to-consumer.

Carbon footprint standards will support the WTO mandate of facilitating international trade.

To improve user-friendliness and consistency, working group WG 2, *GHG management in the value or supply chain*, of ISO technical committee ISO/TC 207, *Environment management*, subcommittee SC 7, *Greenhouse gas management and related activities*, decided to merge Part 1, *Quantification*, and Part 2, *Communication*. The working group allowed for a second round of balloting to ensure that the standard would earn broad support in all countries.

Thanks to an initiative from the Swedish Standards Institute (SIS), ISO member for the country, and the Swedish International Development Authority (Sida), the ISO process has gained significant engagement from developing countries, in particular from the Middle East and North Africa (MENA countries) and the East African Community (EAC countries).

Those contributions are helping to develop an International Standard that will be useful around the world. This strong interest from developing countries is also reflected in the growing engagement of India and China, which will host another meeting of WG 2 scheduled for the spring of 2012.

Toward further harmonization

The fine-tuning of BSI/PAS 2050 and WRI/WBCSD GHG Protocol, together with ISO 14067, is aimed toward further harmonization, addressing not only requirements but also principles, terms and definitions. Participants in all three processes recognize the added value of this parallel



work, which is complementary and does not imply a duplication of effort.

WG 2 decided to align the requirements for addressing direct and indirect land-use changes with the specifications of the revised PAS 2050. These requirements are informed by research in Europe and the American state of California which elaborate details related to sustainability criteria for biofuels.

The ISO process has gained significant engagement from developing countries.

Other sector-specific category rules are under development for the electronic industry by the International Electrotechnical Commission (IEC), and for building construction under ISO 21930:2007,

Cooling down

ISO sets to reduce industrial furnace emissions

by Morihiko Imada

Industrial furnaces and associated processing equipment are used around the world in a range of industrial sectors, including iron and steel, nonferrous metals and glass, gears and bearings, machine parts and automobiles. Annual global production of industrial furnaces amounted to more than USD 13.9 billion in 2006.

Energy consumption for industrial furnaces in Japan amounts to an estimated one-third of the country's total industrial energy use, and about one-sixth of total energy consumption (see **Figure 1**). The Japanese example, extrapolated to other industrialized countries, shows that improvement in the energy efficiency of industrial furnaces could add up to significant reductions in carbon dioxide emissions. Well aware of this equation, furnace manufacturers continue to pursue competitive advantage through energy efficiency at reasonable cost.

Standardization, which has traditionally focussed on furnace safety, is now set to expand to include support for the dissemination of technologies that save energy. ISO technical committee ISO/TC 244, *Industrial furnaces and associated processing equipment*, was established in May 2008

to develop standards for energy efficiency, safety requirements and vocabulary.

The energy supplied to industrial furnaces, especially thermal energy, is not fully utilized, and a great deal of energy is discharged before it is effectively used. To minimize this energy loss, it is necessary to consider a range of steps, including :

- Selection of appropriate of energy sources
- Adoption of suitable combustion or electrical heating conditions
- Selection of high-efficiency combustion systems
- Heat recovery of exhaust gas
- Optimization of operation.

Energy balance sheets

These energy management procedures require acquisition of accurate data for input and output energy, as well as summaries that correctly show how the energy is distributed, consumed and discharged.

The goal of the future ISO 13579, *Method of measuring energy balance and calculating efficiency*, is to specify energy balance sheets and Sankey diagrams that enable calculations of industrial furnace efficiency. An energy balance sheet is a table in which input and output energy of a subject industrial furnace is clearly arranged item by item ; a Sankey diagram displays the flow of energy visually to help operators understand it more easily and intuitively (see **Figure 2**).

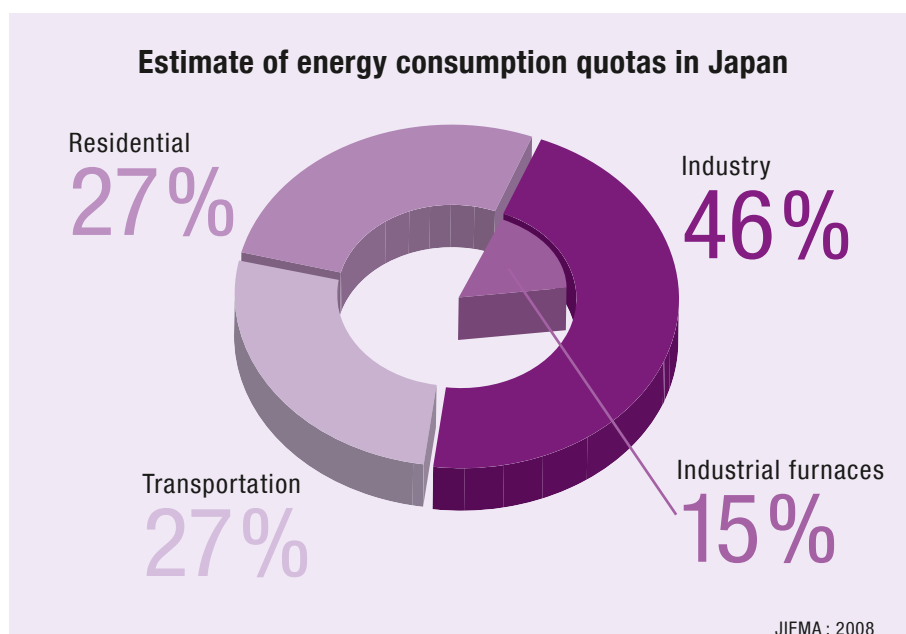


Figure 1: Estimate of energy consumption quotas in Japan.

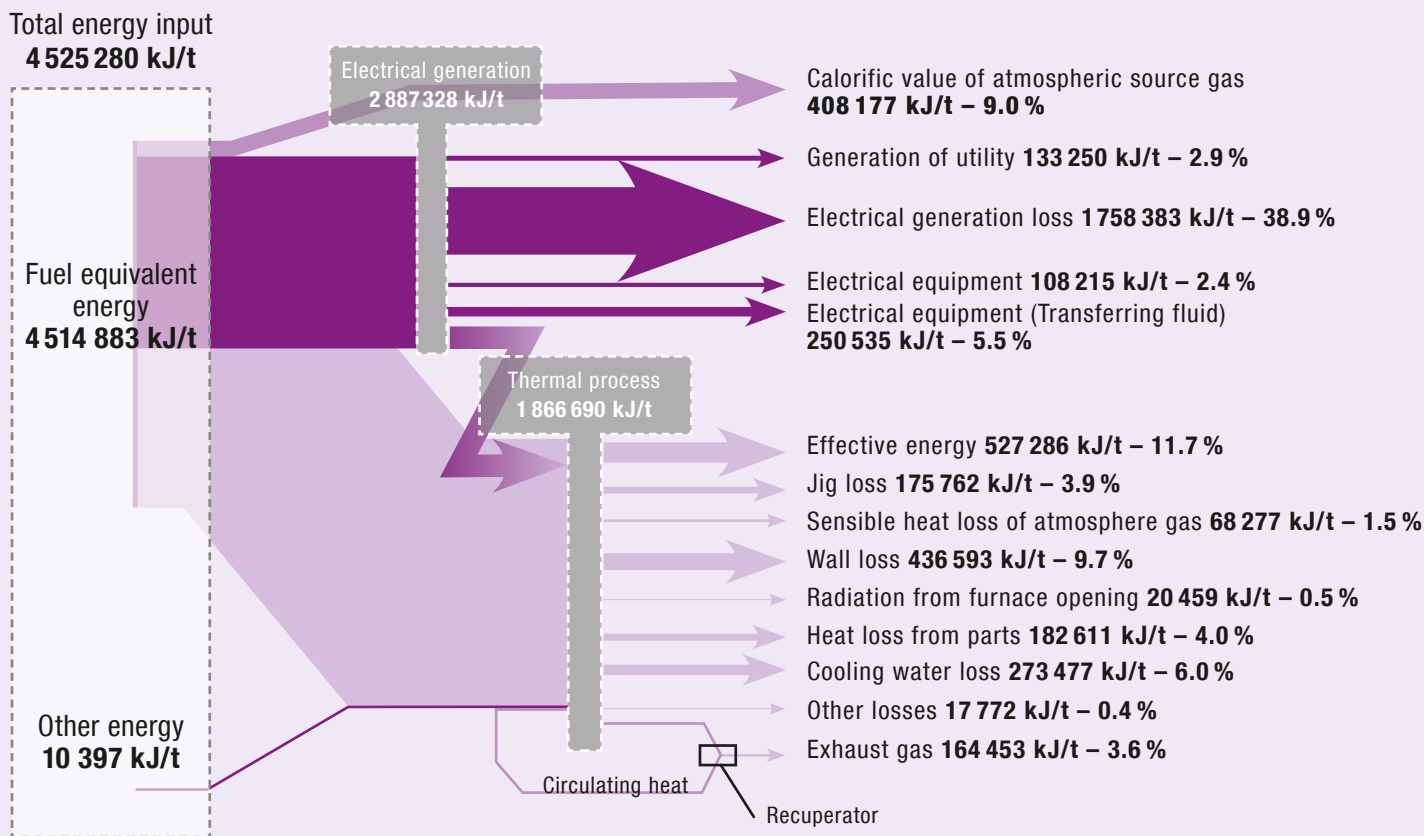


Figure 2: Example of Sankey diagram.

ISO 13579, currently scheduled for publication in mid-2012, consists of four parts. Part 1 specifies common methodology for measurement, calculation and reporting, while the other three parts present specific provisions and conditions for each type of furnace (reheating furnaces for steel, batch-type aluminium melting furnaces, and furnaces with protective or reactive atmosphere). Provisions for other types of furnaces may be added in subsequent parts.

Some of the main features of the future ISO 13579 are:

- Detailed method of combustion calculations
- Energy consumption by auxiliary equipment (blowers, pumps for cooling water, conveyers) and energy consumption in utility generation (steam, oxygen, electricity), in addition to the thermal energy

- Electrical energy is evaluated as fuel equivalent energy, including electrical generation loss
- Efficiency is defined as the thermal energy required for one tonne of processed products divided by the total specific energy consumption of the furnace.

Although ISO 13579 is designed primarily for manufacturers of industrial furnaces during commission tests, users are also encouraged to follow the standard because it is important to check the status of energy consumption (as originally intended for the industrial furnace) and to spot potential improvement for more efficient use of thermal and other energy. ■

About the author



Morihiko Imada is General Manager of Chugai Ro Co. Ltd. R&D Center. He is Convenor of ISO technical committee ISO/TC 244 and working group WG 3, *Industrial*

furnaces and associated processing equipment – Method of energy balance and efficiency.



Compressed air systems

Energy assessments for improved efficiency

by Chris Dee and Greg Bordiak

Compressed air is an industrial utility generated on-site by the user, who is then responsible for its treatment and transmission to the point of use in process machinery. There is a wide variety of applications for compressed air, but some of these waste valuable resources because they are not optimized for maximum efficiency.



It is estimated that more than 10% of industrial electrical energy is consumed in the production of compressed air. As business and governments around the world work to conserve limited energy resources – for example through the future ISO 50001:2011, *Energy management systems – Requirements with guidance for use*, the compressed air industry has developed an assessment standard providing guidelines for generating and analysing data with the aim of improving efficiency.

The future ISO 11011, *Compressed air systems – Energy assessment*, considers the entire system, from energy consumed to the resulting work performed.

The standard considers compressed air systems as three functional subsystems:

- Supply, including the conversion of primary energy resources to compressed air energy
- Transmission, including movement of compressed air energy from point of generation to point of use

- Demand, measuring the total of all compressed air consumers, including productive end-use applications and various forms of compressed air waste.

ISO 11011 sets requirements for conducting compressed air system assessments, analyzing the data from the assessment, and reporting and documentation of assessment findings. A key element is to identify the roles and responsibilities of those involved in the assessment activity.

Shared expertise

The precursor to the current draft, a work item entitled “Reporting on energy efficiency measurements made on-site”, was initiated in 2004 at the meeting of ISO technical committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment* and subcommittee SC 6, *Air compressors and compressed air systems*, in Karlsruhe, Germany. The subcommittee began addressing the task through its working group WG 4 in 2007, conducted jointly by two industry liaison bodies, the European Committee of Manufacturers of Compressors, Vacuum Pumps and Pneumatic Tools (PNEUROP) and the Compressed Air and Gas Institute (CAGI).

All parties agreed on the need for an energy audit standard, but the process was complicated by a lack of consensus over how the content should be presented – and indeed what that content should be.

A key element of ISO standardization is that participants come to the table to share both their expertise and relevant documents. A number of ISO member countries have done work in the energy audit field, including with compressed air systems. Some have produced relatively simple approaches, while others have pursued more detailed methodologies for assessment and auditing.

The USA has produced the most comprehensive approach under the direction of the Department of Energy, resulting in ASME EA-4:2010, *Energy assessment for compressed air systems*. To avoid duplication of effort, the secretariat of WG 4 sought permission to use extracts from EA-4, winning permission in late 2009 to use the core principles.

As a result of an extensive rewrite called for by a 2008 WG 4 meeting in Delft, the Netherlands, the draft was submitted for a second CD ballot in 2010, receiving widespread support.

Bringing order to growth

Compressed air systems are designed to accommodate known uses, but their evolution over time may conceal problems arising from add-ons. These systems involve large pipe runs, and if additions take place without necessary controls users may experience problems like the one described by a site manager who said, “Every Thursday, we run out of compressed air.”

More than 10% of industrial electrical energy is consumed in the production of compressed air.

ISO 11011 aims to bring order to this growth problem by addressing concerns about present uses, critical production functions and compressed air system performance. The assessment should identify and quantify energy waste, balancing compressed air supply and demand, energy use and total compressed air demand. These generalizations will guide the selection of objectives and action items for preliminary data collection.

Even managers directly responsible for compressed air systems often cannot specify a precise level of demand or supply. One of the key features of the future ISO 11011 standard will be the generation of accurate statistics through by establishing baseline performance.

This benchmarking is intended to quantify the current performance levels and costs of a compressed air system, and to correlate the results with the plant’s present production levels. As improvements are made to the system, it will be possible to estimate effect by comparing new measurements with the original baseline.

Like any expensive resource, compressed air systems should be well managed. ISO 11011 addresses waste, starting with leaks that may account for up to 35% of the generated compressed air. But the standard also covers issues such as inappropriate use, for example compressed air being used for cooling when a simple fan could do the job at a lower cost.

ISO 11011 also looks at optimizing air treatment by assessing the need for and efficiency of installed equipment, looking to identify opportunities for performance improvement and reduced energy use.



System-wide compressed air treatment strategies are specified, including remedial measures to optimize treatment.

End-use applications

The standard considers end-use applications as part of the assessment process, including those identified as “critical air demands”, which have the potential to impact values such as product quality, production rate, scrap rate, rework cost and customer satisfaction.

The most relevant effect of improving the performance of a critical air demand is on non-energy benefits to production operations, and may be related less to the compressed air system itself than to the poor mechanical state of end-use equipment. Recognizing the importance of efficient use, the standard emphasizes that there are often energy-efficiency benefits associated

with improving the performance of these critical air demands.

Placing yourself on a diet to lose weight may be a good strategy, but the effort will be in vain without a regime to maintain the benefits. Similarly, commissioning an assessment of a compressed air system and adopting the recommended actions is only a first step; the benefits must be continuously maintained.

ISO 11011 specifies that recommendations shall consider maintenance programs to ensure continued results, including recommendations for specific remedial measures and estimated reductions in energy consumption.

ISO 11011 is not intended to replace existing compressed air assessment activities, but outlines a framework for the assessment and audit process that should dovetail with specific requirements. ■

About the authors



Chris Dee is Director-General of the British Compressed Air Society (BCAS), the world’s only trade association dedicated solely to compressed air.

He is also Convenor of ISO technical committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, subcommittee SC 6, *Air compressors and compressed air systems* and working group WG 4, *Energy management*.



Greg Bordiak is Technical Officer of the British Compressed Air Society (BCAS). He is also Secretary of ISO technical committee ISO/TC 118, *Com-*

pressors and pneumatic tools, machines and equipment, subcommittee SC 6, *Air compressors and compressed air systems* and working group WG 4, *Energy management*.



Going green

Electric cars drive down pollution

New mobility

An electric vehicle is a vehicle using electric propulsion which charges off the electric grid. Considerable efforts have been made by car manufacturers and the chemical industry to improve battery and vehicle performance. This will, in the near future, result in increased interaction between cars and the power grid: increased charge power, vehicle-to-grid technology allowing electric vehicles to feed electricity back into the grid, battery swapping and charging stations, etc.

These changes affecting mobility patterns will require close cooperation between car manufacturers, electric grid managers, utility and charging station operators. In addition, as electric vehicles are almost permanently connected to the Internet when they are connected to the grid for recharging, a large number of services will be developed and create new opportunities in terms of interactions between users and their cars.

Systems interoperability

Consequently, imagination can prosper, provided it is in-line with standardization

by Philippe Dupuy and Gilles Demeaux

Today, car drivers are accustomed to “mobility-based” consumption. In a context of growing scarcity of raw materials, increasing demand for air quality improvements in urban and peri-urban areas, and reduction of global CO₂ emissions, electric vehicles represent one of “green” mobility’s major challenges. Beyond the zero-emissions target, they are also a potential source of added value.

initiatives. These intertwined industrial sectors necessitate the development of solid references that are recognized by all. Indeed, convergence between the electric and the automotive sectors is necessary in order to ensure optimal interoperability of electric mobility systems and services. Standardization also plays a key role in providing a baseline for regulations so that state-of-the-art rules become obligations for all, thereby strengthening the systems that will be implemented. Finally, standardization will also facilitate cooperation between the various electric mobility stakeholders as well as interactions between local authorities and private companies (car park managers, charging station operators, equipment suppliers, etc.).

Connected participants

Standardization of electric vehicles has brought together two different fields: the automotive sector, on one hand, and the electric sector, on the other. Electricity infrastructures are essentially regulated and standardized at the local level. This constitutes a major barrier to proper convergence at the international and regional levels and, in particular, concerning the problem of socket-outlets and related safety aspects.

Car drivers are accustomed to “mobility-based” consumption.

Standardization leads to convergence between the different stakeholders – car manufacturers, energy engineers, power supply operators and regulators – in order to introduce this new means of transportation in its surrounding environment.

International standardization of electric vehicles is carried out by two organizations: the International Electrotechnical Commission (IEC), as regards electrical engineers, and ISO, as regards car manufacturers. As a consequence, care should be taken to avoid overlapping between both areas. The joint groups created for batteries and communications are meant to ensure proper coordination.

Regulatory impact

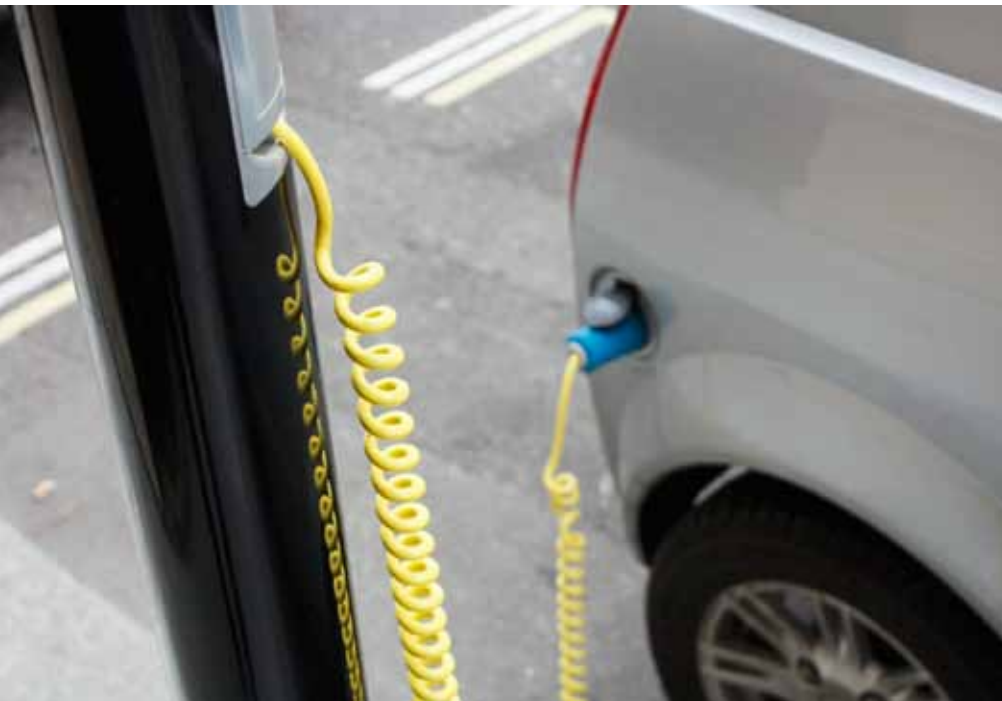
Standardization often becomes a prerequisite for the development or support of new regulations. As far as electric vehicles



Car of the future

New draft standards are being developed in order to address existing and future issues related to electric vehicles:

- Minimal noise level emitted by electric-powered or hybrid vehicles at low speed, so as to avoid risks of accidents with pedestrians in urban areas
- Energy consumption of electric vehicles, in order to standardize road profiles based on types of usage by users, and to enable comparisons
- An inductive loading project whereby the charging process would happen inductively without cables; this approach would improve ergonomics and facilitate the battery charging process for users
- Communication aspects, in particular intelligent transport systems (ITS) representing a communication architecture for cooperative systems
- The future requirements of the “Smart Grid” project, an intelligent distribution network allowing optimization of energy delivery and production based on energy supply and demand. Electric vehicles are thus seen as a potential energy saver which may feed power back smartly to potential users
- A French standard complementing a national regulation on maintenance aspects and qualifications for working on electric vehicles, which spurs reflection at the European, or even, international levels. This standard addresses, inter alia, issues related to emergency services (roadside assistance, fire-fighter interventions, etc.) in the event of an accident, and the handling of traction battery swaps and their end-of-life management
- Work on the robotic battery swap stations as developed by the enterprise, Better Place.



this emerging market generates a number of challenges for the various stakeholders concerned. For instance, a traditional electricity industry can be segmented in geographical areas, creating convergence problems or possible shortcomings in terms of interoperability of all electrical, technical and standardization components of electric vehicles.

Standardization is the necessary tool for creating the conditions for success of electric vehicles.

It should be underlined that the quality of standardization work directly depends on the level of the participants involved in technical committees as well as proper coordination between the various relevant technical committees. The recent ISO/IEC Memorandum of Understanding concerning standardization of electrotechnology for road vehicles – and the discussions on the subject within the European Committee for Standardization – European Committee for Electrotechnical Standardization Focus Group in Europe (CEN-CENELEC) – should facilitate the development of standards on electric mobility that live up to stakeholders' expectations. ■

are concerned, it supports regulations R94 (frontal collision), R95 (lateral collision), and R100 (safety of battery electric vehicles) of the United Nations Economic Commission for Europe (UNECE) in order to meet new safety requirements related to the electric architecture and sensitive components such as electric vehicle batteries.

Standardization also supports regulations on aspects such as Electromagnetic Compatibility (EMC), through regulation R10, in order to specify the operating conditions

of electric vehicles in terms of emissions and immunity when connected to the grid for recharging.

Sharing know-how

The electric vehicle market enables different stakeholders to share their know-how and sense of technical and commercial innovations. Standardization is the necessary tool for creating the conditions for success of electric vehicles. Of course,



About the authors



Philippe Dupuy is Project Manager, Electric vehicle recharging infrastructures, Electric vehicle technical department, at the Renault Technocentre in

Guyancourt, France. He is also the Vice Chairman of the European Committee for Standardization – European Committee for Electrotechnical Standardization (CEN-CENELEC) Focus Group mandated by the European Commission to propose standardization of interoperable charging systems intended for future smart grids. He is the Convenor of one of the seven working groups of the focus group dedicated to the different charging methods and types of power supply.



Gilles Demeaux is in charge of standardization matters on energy, environment and electric vehicles at the Research and Development/Regulations/Type

Approval/Standards Department of PSA Peugeot-Citroën Group's technical centre in Vélizy Villacoublay, France.

He participates with other experts in the various national, European and international standardization groups, in order to coordinate and prepare the positions of the PSA Group. Consensus must be achieved among all stakeholders in order to create the new green mobility offered by electric vehicles.

Six ISO responsibilities for Iran's Tabari

Ms. Mojdeh Rowshan Tabari, a microbiologist with ISIRI, the ISO member for the Islamic Republic of Iran, serves as secretary of three ISO technical committees and convenor of three working groups, making her one of the most prolific contributors to ISO today. She says she would like to see others step up and share their expertise on multiple committees.



Mojdeh Rowshan Tabari.

Why do you find it worthwhile to devote so much effort to working with ISO?

Ms. Tabari: I believe that ISO is very important because we are working to benefit people everywhere in the world. Anyone who has gained a lot of standards experience should do as much as possible to pass on that knowledge and contribute to the work that still needs to be done. Standards help developed countries to facilitate trade, and they help developing countries by transferring technology and information.

How much of your time is devoted to your ISO projects?

Ms. Tabari: It depends on my workload and the situation with the projects. During the course of a year, I would estimate that more than half of my time goes to ISO. I live my ISO work! Time is short and I enjoy the feeling of accomplishment that comes with moving things forward.

You have been involved in the establishment of a new ISO TC and re-activating other committees that had become dormant. What fields are those committees working in?

Ms. Tabari: ISO/TC 217, *Cosmetics* needed a huge amount of work to get started. After my appointment as secretary of two other committees, I worked hard to re-start two TCs that had been dormant for more than 10 years: ISO/TC 91, *Surface active agents* and ISO/TC 134, *Fertilizers and soil*



Participants at the 50th TMB meeting.

conditioners. Now I would like to utilize this experience further. There are other inactive ISO committees that should be brought back into operation and also a lot of new ISO committees that should be established, because they can help us contribute to the better world that we're all striving for, and which is necessary for the next generation."

50th TMB meeting

The ISO team of senior managers responsible for oversight of the 3274 technical bodies that make up the ISO standards development system celebrated its 50th meeting in March, in Geneva, Switzerland.

During its half-century of meetings since it was established in 1994, the ISO Technical Management Board (TMB) has seen its role evolve from strictly technical issues, such as adjudicating between scopes of the committees that develop ISO standards, to also cover strategic matters, such as the TMB

contributions to the on-going realization of objectives and vision set out in *The ISO Strategic Plan 2011-2015*.

"We are still responsible for 'nuts and bolts' issues, but in addition to our work in the 'engine room' of standards development, we also provide our colleagues on the "bridge" – ISO Council – with strategic advice and recommendations," comments TMB Chair, Jacob Holmblad.

Membership of the TMB rotates among ISO national member bodies and currently includes representatives from: Australia, Brazil, Canada, China, France, Germany, India, Japan, Republic of Korea, Malaysia, South Africa, Sweden, the United Kingdom and the USA.

A more detailed article on the work of the TMB and the benefits it provides will appear in the July-August issue of *ISO Focus+* magazine which includes a Special Report on the standards development chain.



ISO Technical Management Board Chair, Jacob Holmblad, about to cut the anniversary cake celebrating the 50th TMB meeting. (photo: ISO/PGR)



ISO/IEC Smart Card Registration Authority

The appointment of a worldwide registration authority for smart card authentication protocols conforming to the ISO/IEC 24727 standard will ensure greater interoperability and security for this technology which plays such a vital role in establishing identity so that services such as healthcare, banking and transport go to the right person.

Smart cards are also used by governments and by public and private sector organizations for identification in critical areas such as security access and border controls.

The ISO/IEC 24727 standard provides a globally harmonized approach to the widely recognized need for consistency in the way smart card technology – specifically, their crucial authentication protocols – are standardized. The new registration component is contained in Part 6 of the standard. The Australia-based SAI Global has been appointed as the ISO/IEC 24727-6 Smart Card Registration Authority .



From now on, there is a central repository where any authentication protocol can be publicly registered. From this point on, the specific authentication protocol can be explicitly referenced by its unique ISO/IEC compliant object identifier (OID).

This new approach has been long awaited and is welcomed by both developers and adopters of smart card technology. It has been designed to provide greater extensibility, efficiency and interoperability for smart card schemes – with associated benefits to the entire international community.

Online tutorial on new ISO/IEC 17021

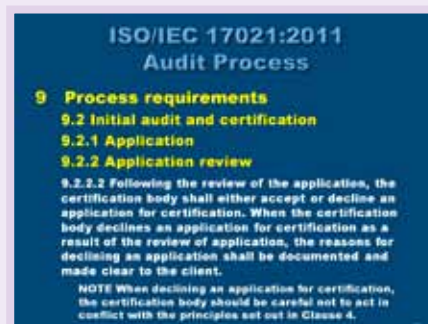
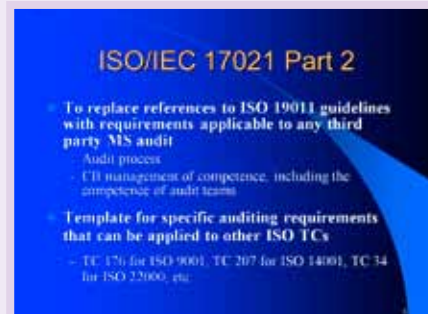
A free tutorial on the improved second edition of ISO/IEC 17021, the International Standard that sets new requirements for the auditing of management systems and for auditor competence, is now available on the ISO Website at www.iso.org/tutorial17021

The purpose of ISO/IEC 17021:2011 is to increase the value of management system certification to public and private sector organizations worldwide. The online tutorial on the standard has been made available by the ISO Committee on conformity assessment, (ISO/CASCO). It was developed by Randy Dougherty and Alister Dalrymple, two leaders of the working group responsible for the standard.

The tutorial (available in English only), consists of three PowerPoint presentations, including notes:

- An overview (27 slides)
- Audit process (62 slides)
- Auditor competence (19 slides).

The tutorial explains the differences from the first edition, published in 2006, and the new requirements. ■



Normative Annex A

Knowledge	Competence	Experience	Education	Training	Other
Knowledge of basic management systems	1	1	1	1	1
Knowledge of audit process, methods and techniques	1	1	1	1	1
Knowledge of specific management systems	1	1	1	1	1
Knowledge of certification body processes	1	1	1	1	1
Knowledge of other management systems	1	1	1	1	1



ISO 22000 on the menu

Food specialist's multi-standard system

by Garry Lambert

The Crown Group, a leading United Kingdom-based provider of food, venue and event solutions, has achieved certification to ISO 22000:2005, *Food safety management systems – Requirements for any organization in the food chain*, in recognition of its ability to control food safety hazards and ensure that food is safe for human consumption.

With ISO 22000 implementation, the organization now holds certification to four management standards, including ISO 9001, ISO 14001 and OHSAS 18001, in a system that now integrates quality, environmental, food safety and occupational health and safety management.

Integrating management systems

ISO Focus+ asked Karl Wilkinson, Safety and Assurance Manager for the Crown Group, to explain how his company integrated all four management systems, and what benefits have been achieved.

“In order to create a truly integrated approach, the first stage was to develop the management system in conjunction with the various businesses in the group,” he replied. “It was important that they were engaged from the outset in order for them to be able to understand compliance further down the line.

“We also issued the managing directors of the businesses with a copy of the management system, and armed them with the information they needed to implement and monitor compliance in their businesses via regular audits. This is then supported by additional audits which I complete to ensure a second level of monitoring to safeguard compliance.

“The procedure wasn’t simple and nor should it be. Whilst the standards are quite demanding and sometimes very prescriptive, the correlation between the stages is seamless so you are able to work through the requirements in an ordered manner that flows appropriately.

“There are naturally many common requirements shared by all of the standards,



A chef from Seasoned Events which is a food and events provider and a Crown Group company, observes strict hygiene measures, in accordance with ISO 22000 food safety requirements.

Crown Group at a glance

The Crown Group is an independent organization based in Romford, Essex, United Kingdom, consisting of individual companies providing service solutions in the food, venue, marquee, equipment hire and staffing industries.

Formed in 1978 by a group of qualified chefs, Crown has developed into nine businesses with over 1 000 employees and an annual turnover over of approximately GBP 40 million. These include Kudos food and venue management services; Seasoned Events contract and outside catering; At-Home high-end catering; Piggotts marquees, flags, branding and festive lighting; The Event Hire Company furniture hire; Flying Chef office delivered catering; Jobs 2 Go staff hire; Leisureextra public and private sector café catering, and Midsummer House, a two Michelin-starred restaurant in Cambridge, UK.

The Crown Foundation, launched as a charity in 2008, helps to support the group's partnerships with other charities, including the "Forces Children's Trust" and the "Make A Wish" Foundation.



Frank Bordoni, Development Director for Kudos food and venue management services, a company of the ISO 22000-certified Crown Group, is careful to use only fresh ingredients of the highest quality.



Karl Wilkinson (left), Safety and Assurance Manager for the Crown Group, accepts the ISO 22000 certificate from **Danny Littlechild**, lead assessor of certification body, QMS International.

so the latest standard we achieved was less difficult as we have a feel for the process.

Benefits

"We have found that there are numerous benefits to securing the standards, namely having a defined procedure in place with a structured management system that can be audited and performance benchmarked. In addition, all procedures required for the standard are recorded in the relevant management system manual, and this can then be used as a useful structure for training and management of the business," Karl Wilkinson explained.

The latest standard was less difficult as we have a feel for the process.

"Finally, there is a great benefit in having external recognition for the systems and processes, as not only will it reassure

existing clients that you have all of the necessary procedures in place, but it also acts as a selling tool to prospective clients looking for a business that conforms to the highest standards of compliance."

Advice to others

ISO Focus+ asked Mr. Wilkinson if he had advice for other companies considering integrating their management systems.

"I would advise others who are interested in going through the process to ensure that they allow sufficient time to monitor the management system that they are creating to ensure that it reflects what the business delivers," he replied. "Businesses should also look to their existing systems to see if there are any synergies between the criteria for the standards and procedures already in place – many businesses will find that they are already complying in many respects." ■

Garry Lambert is a British freelance journalist based in Geneva, Switzerland.



Little and good.

ISO 9001 for Small Businesses

Robins have a reputation for “punching above their weight”. Small birds, they nevertheless defend their territory energetically. At the same, they are curious and will sometimes approach surprisingly close. Qualities like courage, energy and curiosity are among those often possessed by managers of small businesses. But such qualities can be usefully complemented by knowledge of



the benefits to efficiency and effectiveness brought by implementing an ISO 9001 quality management system. The latest, 2010 edition of the handbook, *ISO 9001 for Small Businesses*, explains in user-friendly language, with lots of practical examples, how to achieve these benefits. A business can be little, but also very good.

Available from ISO national member institutes (listed with contact details on the ISO Website at www.iso.org) and from the ISO Central Secretariat Webstore at www.iso.org/isostore or e-mail to sales@iso.org.

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Thumbs up or down?

New ISO specification will increase transparency and reliability of credit assessments

by Elizabeth Gasiorowski-Denis

Credit bureaus and their customers who seek to operate in an international market now have a valuable tool in a new ISO technical specification which offers a harmonized, more transparent and more reliable approach to assessing the creditworthiness of companies.

ISO/TS 10674:2011, *Rating services – Assessment of creditworthiness of non-listed entities*, provides common terms, definitions and basic process requirements for the assessment of creditworthiness (“Is the company worthy of having credit extended to it?”).

Extending credit to companies is a common component of business today. However, for small and medium-sized enterprises (SMEs) in particular, the decision to extend credit can involve numerous financial concerns. These concerns need to be answered beforehand to avoid a host of problems afterward – which begs the question: “Is credit assessment reliable?”

In view of the increasing number of credit assessment service organizations, each with its individual assessment system, there is now a clear need for a common evaluation and communication tool – which is answered by the new ISO technical specification.

ISO/TS 10674:2011 is a bi-product of the financial crisis.

Dr. Olivier Everling, Chair of the project committee that developed ISO/TS 10674:2011, explains, “In the aftermath of the financial crisis, rating agencies and credit bureaus needed to simplify and provide broader market access to rating criteria, underlying models and analytical tools, to better organize information about their criteria, models and policies, and to offer access to additional analytical tools.

“ISO/TS 10674:2011 is a bi-product of the financial crisis intended to promote transparency and enable the market to best judge the performance of the assessments. It will be an invaluable tool for promoting international trade by making it possible to obtain more reliable credit assessments of even the smaller partners in global markets.”

ISO/TS 10674:2011 was prepared by ISO/PC 235, *Rating services*. It is available from ISO national member institutes (www.iso.org). It may also be obtained directly from the ISO Central Secretariat through the ISO Store or by contacting the Marketing, Communication and Information department (sales@iso.org). ■

Elizabeth Gasiorowski-Denis is Editor, *ISO Focus+*.

Are hackers putting your business in danger?

New ISO/IEC standard proposes a solution

by Elizabeth Gasiorowski-Denis

With all organizations susceptible to cyber-attacks, a new International Standard on business continuity management processes has a huge potential to improve security measures taken against hacking, denial of service and malware attacks.

ISO/IEC 27031:2011: *Information technology – Security techniques – Guidelines for information and communication technology readiness for business continuity*, gives advice that will be useful for all types of security-conscious organizations, regardless of their size, complexity and risks.

Information and communication technologies (ICT) have become an integral part of the critical infrastructure in all sectors, whether public, private or voluntary. The proliferation of networking services, and the capabilities of systems and applications, has also meant that organizations are ever more reliant on safe and secure ICT infrastructures. Failure of these systems will impact the continuity of business operations.

The critical functions that require business continuity are usually dependent upon ICT. This dependence means that ICT disruptions can constitute strategic risks to organizational reputation.

ISO/IEC 27031:2011 will allow organizations to develop and implement a readiness plan for the ICT services to help ensure business continuity in times of disruptions.

The standard describes the concepts and principles of ICT readiness. It provides a framework of methods and processes to

identify and specify all aspects, such as performance criteria, design, and implementation for improving an organization's ICT readiness. It also enables an organization to measure performance parameters that correlate to its ICT readiness for business continuity programme (IRBC) in a consistent and recognized manner.

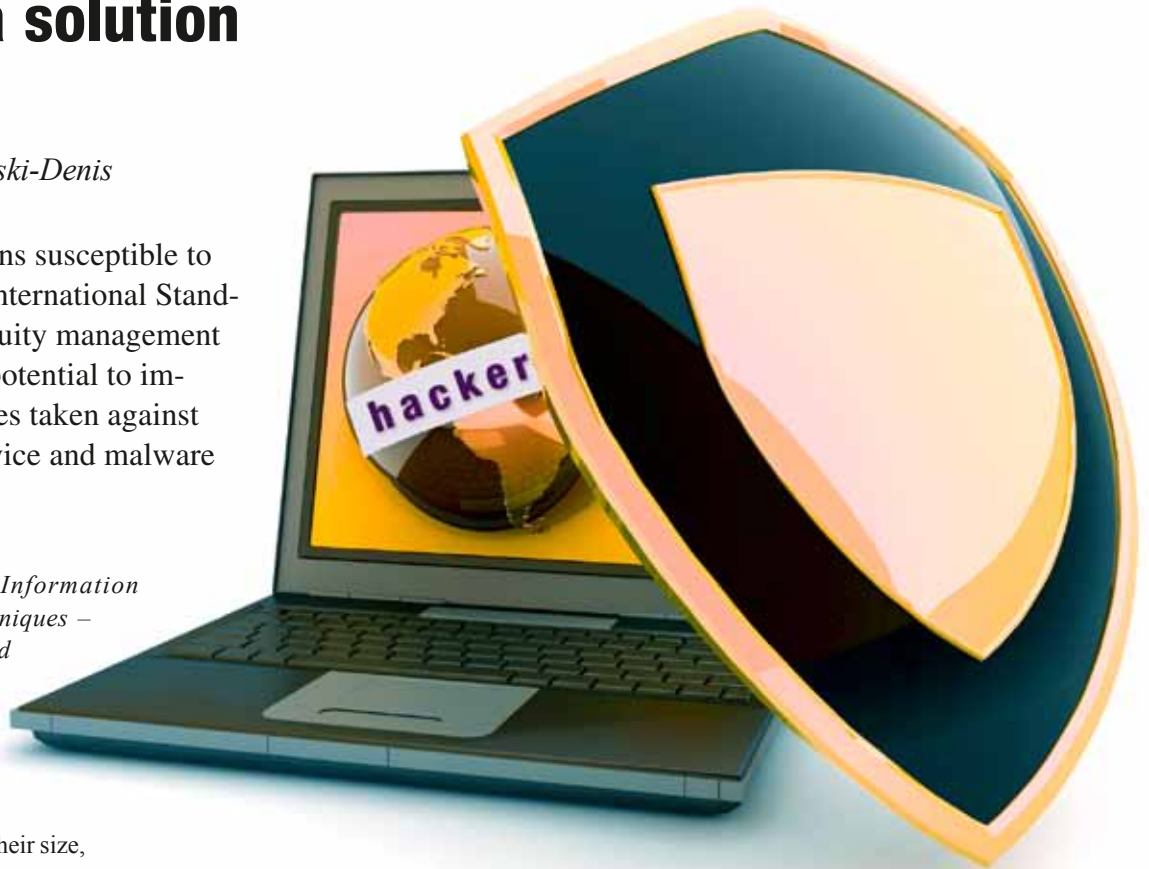
Organizations need to be ahead of the game.

Prof. Edward Humphreys, Convenor of the working group, which developed the ISO/IEC 27001 standard, comments: "The business environment is constantly changing – along with threats to a company's survival. Organizations need to be ahead of the game, and an excellent defence can be

built around risk-based information security management system (ISMS) founded on ISO/IEC 27001, together with business continuity management processes based on ISO/IEC 27031."

ISO/IEC 27031:2011 covers all events and incidents (including security related) that could have an impact on ICT infrastructure and systems. It includes and extends the practices of information security incident handling and management and ICT readiness planning and services.

ISO/IEC 27031:2011 was developed by ISO/IEC JTC 1, *Information technology, SC 27, IT Security techniques*, and is available from ISO national member institutes (www.iso.org). It may also be obtained directly from the ISO Central Secretariat through the ISO Store or by contacting the Marketing, Communication and Information department (sales@iso.org). ■





Donors' money well spent

Developing countries represent three quarters of ISO members and have a tremendous need to understand and implement good practices in standardization as well as to contribute to the process of developing standards.

ISO, through the activities of its Committee on developing country matters (ISO/DEVCO), its members from developed countries and some important donors, support developing countries in order to increase their involvement in the development, adoption and implementation of International Standards in sectors and subjects of interest to them. The purpose is to contribute to:

- Improving developing countries' economic growth and access to world markets
- Enhancement of the lives of citizens
- Fostering innovation and technical progress
- Achieving sustainable development when considered from the economic, environmental and societal perspectives.

The Special report of the June issue of *ISO Focus+* will feature an array of articles highlighting the diverse technical assistance projects aimed at developing countries and how this is made possible through the generous support of donor agencies.

In recent years, many efforts to introduce education on standardization in higher education have been launched in many

universities and academic organization. An article on the ISO award on higher education shows how it encourages raising awareness throughout world and makes it possible to share best practices by disseminating the curriculum and pedagogical methods.

In other articles, a selection of ISO members from developed countries give examples on how they support developing countries to be more involved in international standardization and some important donors tell how they support the effort and work of strengthening the standardization activities.

Recipients of these funding initiatives, ISO members in developing countries, share their views on the overall benefits of assistance to their national economies in general, and to their national standard institutes in particular. They also go on to explain their expectations for a future programme on institutional strengthening which will provide them support towards improving governance, processes, participation in international standardization work, financial sustainability and stakeholder engagement.

Extracts of *ISO Focus+* interviews with Pascal Lamy, Director-General of the World Trade Organization (WTO) and John Wilson, a Lead Economist at the World Bank, highlight the importance of international standards for boosting economic growth and world trade, particularly for developing countries.

To know more about the work done by ISO and its donors read the *ISO Focus+* June issue. ■

Guest interview

In an exclusive interview, Ulf Kallstig, Head of Unit for Global Programmes at the Swedish Agency for International Cooperation (Sida), explains the Agency's reasons for supporting ISO in working to improve capacity of the national standards bodies (NSBs) in developing countries and how it is an important task outlined in the *ISO Action Plan for developing countries 2011-2015* and will be an important building block on the way to a more inclusive trade, locally, regionally and globally.

He comments: "Globalization of trade and of many other issues, such as health, safety or environmental protection have increased the importance of International Standards. If developing countries participate in the development of International Standards it can result in a higher degree of participation in global trade, greater competitiveness, growing market shares and a higher value-added to their products." ■



ISO Focus+

ISO Focus+ is available online. Readers can access *ISO Focus+* directly in their browsers at www.iso.org/isofocus+online. Subscribers can also search and browse past issues of *ISO Focus+*, as well as of the magazine's predecessors *ISO Focus* and *ISO Management Systems*. Bonus articles are also published on the Website.



ISO Update

The *ISO Update*, a monthly supplement to *ISO Focus+* is available electronically (PDF) in both English www.iso.org/isoupdate and French www.iso.org/fr/isoupdate.



The *ISO Update* informs about the latest developments in the ISO world, including ISO member bodies' CEO and address changes, draft standards under circulation, as well as newly published, confirmed or withdrawn standards. It also includes a list of upcoming technical committee plenary meetings.





**Hard work
is one thing.
Exploitation
is another.**

ISO 26000, *Guidance on social responsibility*

The first link in a global supply chain may be a little guy carrying a heavy load. The difference between hard work and exploitation depends on criteria like adequate pay, working conditions, health and safety factors, and social protection. Labour practices comprise one of the seven core subjects of social responsibility defined in ISO 26000, along with 37 underlying



issues and seven overarching principles. All are based on consensus among 99 countries and 42 international organizations from both public and private sectors. People worldwide now demand that organizations behave in a socially responsible manner. ISO 26000 shows how – and the benefits of doing so. Link up now!

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