

News and media News 2011 [ISO 50001 energy management standard impacts the bottom line](#)

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## ISO 50001 energy management standard impacts the bottom line

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Substantial improvements in energy efficiency with positive financial impacts have been experienced both by a major company and by a small business taking part in a pilot programme to test the new **ISO 50001 energy management standard**.



From left: Ken Hamilton (ISO/PC 242 expert); ISO Secretary-General Rob Steele; Marco Matteini (ISO/PC 242); Alberto J. Fossa (ISO/PC 242); moderator, Nicolas Fleury. (Photo: ISO/Granier).

These results were reported on 17 June 2011 at the launching by ISO of the new standard at the Geneva International Conference Centre (CICG), Switzerland.

ISO Secretary-General **Rob Steele** told the international audience of nearly 200 people attending the event: "Energy is no longer a technical issue, but a

management issue with an impact on the bottom line and the time to address the issue is now."

The event included presentations by three out of some 100 experts from 45 countries who participated in developing the standard.

**Ken Hamilton**, Director, Global Energy and Sustainability Services, Hewlett Packard (USA), described ISO 50001 as a "very pragmatic standard" which will help companies to integrate energy management with business practices. It will allow multinational companies like Hewlett Packard to reduce energy costs and increase the efficiency of energy use throughout global supply chains.

Mr Hamilton quoted results from two pilot implementations which were part of the Superior Energy Performance programme sponsored by the US Council for Energy Efficient Manufacturing and the US Department of Energy.

He cited the experience of two plants. One of them was a plant owned by a major company, Dow Chemicals. The plant reduced its use of energy by 17.9 % over two years. At the same time, ISO 50001 principles are also successfully implemented by small businesses as shown by the experience of the other plant, CCP, of Houston,



Rob Steele



Ken Hamilton

Texas, employing 36 people. In two years, it achieved energy savings of 14.9 %, worth USD 250 000 a year with zero capital investment.

**Alberto J. Fossa**, Director, International Copper Association/MDJ, Brazil, underlined the international expertise that had been distilled in ISO 50001, with meetings to develop the standard held in China, the USA, Brazil and the United Kingdom.

At these, a common understanding had been forged between experts in technical efficiency on the one hand and in management on the other to produce a standard that will help all types of organization to achieve continual improvement of their energy performance.



Alberto J. Fossa

**Marco Matteini**, of the Industrial Energy Efficiency Unit, the United Nations Industrial Development Organization (UNIDO), said that forecasts of future energy demand highlighted substantial increases in developing countries, thus underlining the importance and relevance of ISO 50001 for organizations in emerging economies.

The launch event, moderated by the ISO Director of Marketing, Communication and Information, Nicolas Fleury, saw the first public showing of the short video, *ISO and energy management*. This video is among the material available on a multimedia news release published on the ISO Website, making the launch event available to a worldwide public. It includes video interviews of the speakers, videos of their presentations, their PowerPoint slides, the new ISO brochure *Win the energy management challenge with ISO 50001*, and links to related ISO material.

\* Photos: ISO/Granier



Marco Matteini

# 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.<sup>1)</sup> 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.

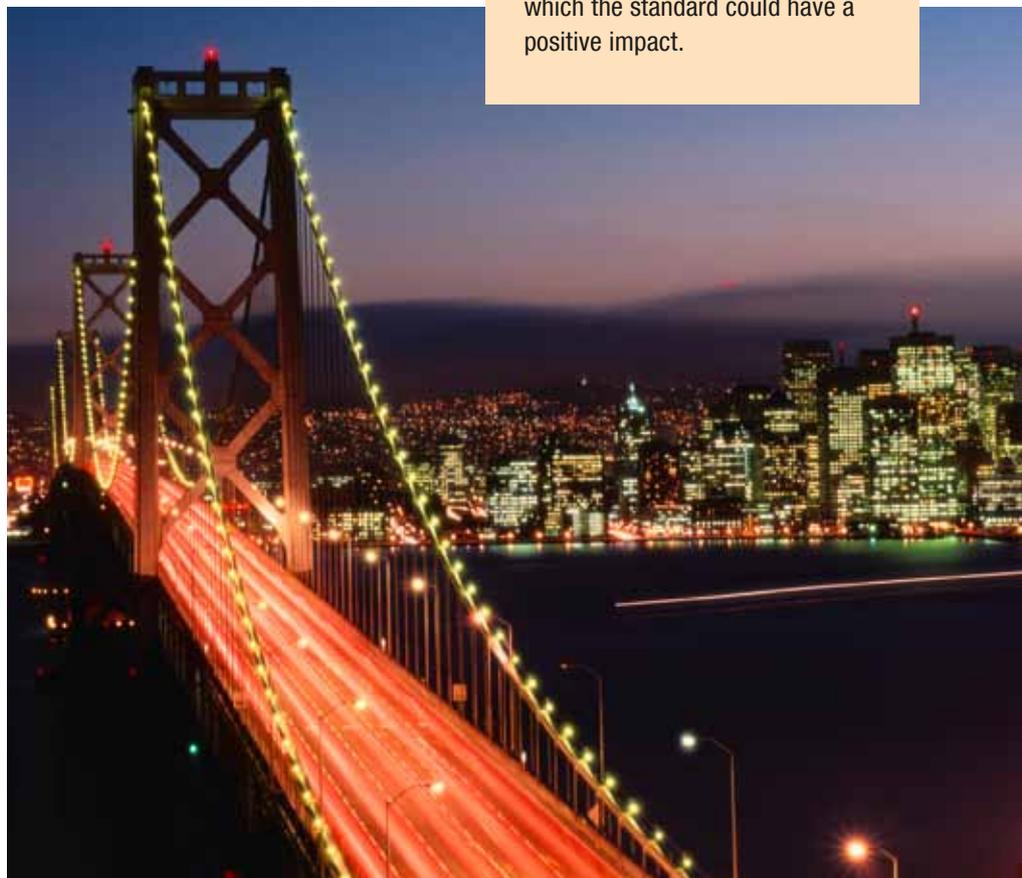
When the committee was created, the aggressive schedule calling for a final standard by 2011 seemed a nearly insurmountable task, especially considering the time periods required for balloting. However, the urgent need for an International Standard that would provide a management tool to deal with

## 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.

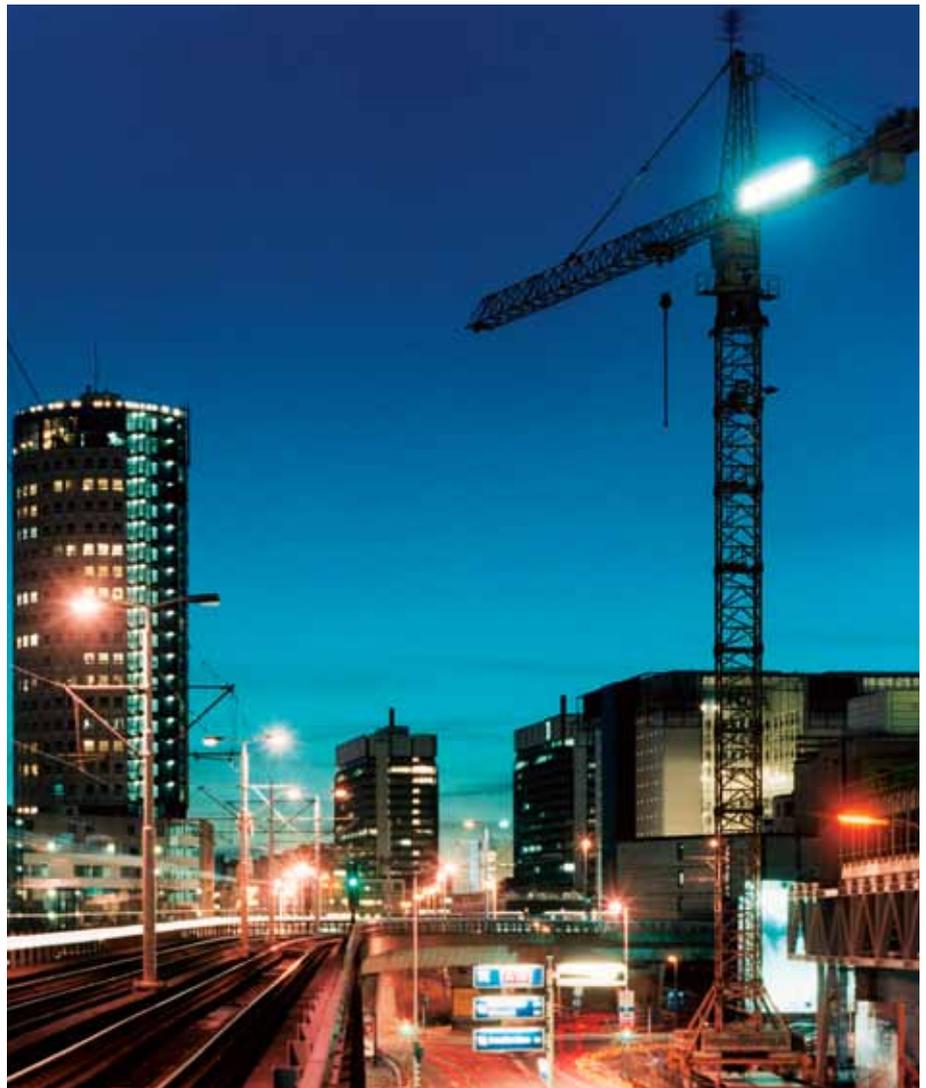
## How ISO 50001 will help

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

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*ISO has identified  
energy management as  
a priority.*

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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 reheat 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.