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.

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.

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 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

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.

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

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.

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