



# ISO & energy

Working for a cleaner, sustainable future



Energy efficiency and renewables are key to meeting the world's energy demand and reducing up to 40 % of carbon emissions by 2050

**ISO** standards represent consensus on concrete solutions and best practice for energy efficiency and renewables

**ISO** standards open up markets for innovations that address the energy challenge





Meeting the energy challenge is key to ensuring a sustainable social, economic and environmental future. Energy efficiency, together with the use of lower carbon energy sources, including renewables, is the way to get us there.



## ISO – what it is, what it achieves

ISO (International Organization for Standardization) is the world's largest developer of voluntary International Standards providing benefits for business, government and society. ISO is a network comprising the national standards institutes of 164\* countries. ISO standards make a positive contribution to the world we live in. They promote quality, ecology, safety, reliability, compatibility, interoperability, efficiency and effectiveness – and at an economical cost. They facilitate trade, spread knowledge, and share technological advances and good management practices.

### The energy challenge

Today, 50 % of the world's population lives in cities. Among the most important processes that determine the energy pattern of a city are transportation and traffic management, building, heating and cooling, sanitation and waste management, and communication networks.

Energy efficiency and low-carbon renewable energy technologies can help us address climate change, energy security and access to energy. But standards are needed for worldwide implementation.

Recognizing the importance of energy for sustainable development and economic growth, the United Nations defined three major goals for 2030 :

- Ensure universal access to modern energy services
- Reduce global energy intensity by 40 %
- Increase renewable energy use globally to 30 %

\* As of November 2012

## Why ISO standards for energy ?

The energy challenge cuts across borders and requires the concerted effort of all countries. ISO International Standards are developed with all stakeholders on board: industry, government and consumers. They represent global consensus on practical technological solutions that can be implemented everywhere.

Information, communication and education are essential instruments for promoting a culture of energy efficiency. ISO standards disseminate state-of-the-art technology that can help provide secure, affordable and universal energy access and minimize pollution to all countries in the world. By facilitating interoperability and opening markets to new technologies and innovations, ISO standards are powerful cost-effective tools that can ease the transition to renewable energy sources.

## Who benefits from ISO standards ?

**Organizations large and small** can apply voluntary International Standards to save energy and costs, and actively commit to sustainability without it being "imposed from above". ISO standards avoid reinventing the wheel so resources can be invested in other areas like research and innovation.

**Regulators** can rely on trusted internationally harmonized solutions and best practice, which are continually reviewed and improved, as a technical basis for market-friendly regulations that meet the expectations of their citizens. Governments can use ISO standards as practical tools to achieve their energy goals.

## ISO 50001

Several early adopters are reporting significant benefits and energy cost savings from ISO 50001:2011, *Energy management systems – Requirements with guidance for use*. It is estimated that the standard, which supports management strategies to increase energy efficiency, reduce costs and improve energy performance, can influence up to 60 % of the world's energy use.

Bentley, Coca-Cola, Delta Electronics in China, Schneider Electric of France, the Dahanu Thermal Power Station in India, and LCD TV maker AU Optronics Corp of Taiwan, Province of China, are just some of the organizations that have reported benefits of using ISO 50001.

## What ISO standards for energy?

Out of a total of over 19 400\* published International Standards, more than 155\* relate to energy efficiency and renewables. Many more are being developed by ISO's technical committees (TCs):

**Carbon capture and storage (CCS)** – A set of innovative technologies to extract carbon dioxide (CO<sub>2</sub>) emissions from large stationary sources, to be injected into a geologic storage formation for safe and secure disposal. ISO is working on standards to facilitate the uptake of this new technology.

**Energy management** – In addition to energy management standard ISO 50001, ISO is developing standards for energy performance indicators, monitoring, measurement, analysis and verification of energy performance.

**Energy savings** – ISO is working on standards to help organizations calculate energy savings in renovation projects, industrial enterprises and regions.

**Environmental management** – ISO 14044 for life cycle assessment, ISO 14025 for environmental labels and declarations and the future ISO 14067 for the carbon footprint of products are examples of standards increasing transparency.

**Terminology** – To facilitate communication and understanding, the future ISO/IEC 13273, *Energy efficiency and renewable energy sources – Common international terminology*, will compile harmonized definitions.

### Sector specific

**Building** – From design and construction, to operation and maintenance, some 80 ISO standards can help reduce energy consumption in buildings, while ensuring an acceptable indoor environment. They cover areas such as thermal performance, insulation, materials and products, components and elements, energy use calculation, climatic data, ventilation, energy conservation, sustainability, carbon metrics, lighting, refrigeration and air-conditioning.

### Green buildings

Energy consumption in buildings represents nearly 40 % of the world's total energy use. Examples of key ISO standards:

- ISO 23045 – Energy efficiency assessment of buildings
- ISO 13790 – Calculation of energy use for heating and cooling
- ISO 15927-4 – Hygrothermal performance
- ISO 18292 – Energy performance of fenestration (windows) systems
- ISO 13153 – Energy-saving design of households and small buildings
- ISO 16343\*/ ISO 16344\*/ ISO 16346\* – Energy performance ISO
- ISO 16818 – Terminology

\* In development

**IT and household appliances** – Standards addressing the performance of information and communication technology (ICT) machines and household appliances help reduce power consumption and maximize energy conservation. A joint ISO/IEC subcommittee is developing IT sustainability standards. The future ISO/IEC 30132 will help make energy efficient ICT products.

**Transport** – ISO standards for ships, aircraft, road vehicles, motor cycles and mopeds address issues such as fuel consumption and emissions. ISO standards for electric and natural gas vehicles, and fuelling stations, will help disseminate this cleaner technology around the world, facilitating economies of scale.

**Industrial products and processes** – ISO standards for machines and equipment, combustion engines, refrigeration and air conditioning, automation systems, industrial fans, fluid power systems, compressors, air and gas cleaning equipment, etc., increase performance and effectiveness to reduce power consumption.

**Power generation** – ISO standards for technical energy systems (TES) help define, describe, analyze and compare TES. ISO also has standards for gas turbines used in power generation.

### Renewables

**Bioenergy** – The future ISO 13065 will specify sustainability principles, criteria and measurable indicators for the processes involved throughout the supply chain of bioenergy, an energy source derived from biological sources (biomass) such as wood, straw, manure and sugarcane.

**Solar power** – ISO has published 16 standards for solar thermal energy systems terminology, classifications, performance rating and test methods.





**Wind power** – ISO 81400-4 outlines design and specification of gearboxes for wind turbines.

**Solid biofuels** – ISO is developing a series of standards on solid biofuels outlining specifications and classes.

**Hydrogen** – Although not strictly renewable, ISO standards for green hydrogen technologies cover areas such as gaseous liquid hydrogen, fuel (including airport fuelling facility operations), detectors, generators, etc.

## Future cars

Transportation accounted for 27% of the world's energy consumption in 2008. Energy use will increase by an average 1.4% per year from 2008 to 2035. Examples of standards for electric, fuel cell (hydrogen), natural gas and hybrid vehicles:

- ISO 8714 – Electric vehicles energy consumption and range
- ISO 6469 – Electric vehicles safety
- ISO 23274 – Hybrid-electric vehicles emissions and fuel consumption measurements
- ISO 23828\* – Vehicles fuelled with compressed hydrogen
- ISO 16923\* & ISO 16924\* – Natural gas filling stations

\* In development



## ISO's partners

The development of International Standards cannot take place in isolation. The value of ISO standards relies heavily on its multi-stakeholder approach, which consolidates contributions from industry, government, research, academia, regional and nongovernmental organizations representing all stakeholders including consumers and small businesses.

ISO works closely with key organizations in the energy field, such as the International Energy Agency (IEA), the International Electrotechnical Commission (IEC), the World Energy Council (WEC) and the Efficiency Valuation Organization (EVO), as well as sectoral organizations like the International Commission on Illumination (CIE).

## ISO Resources

### ISO's Website

[www.iso.org](http://www.iso.org)

### ISO Focus+ magazine

(10 editions annually in English and French)

[www.iso.org/isofocus+](http://www.iso.org/isofocus+)

### ISO videos

[www.iso.org/youtube](http://www.iso.org/youtube)

Follow us on **Twitter**

[www.iso.org/twitter](http://www.iso.org/twitter)

Join us on **Facebook**

[www.iso.org/facebook](http://www.iso.org/facebook)

Join us on **GooglePlus**

[www.iso.org/gplus](http://www.iso.org/gplus)



**ISO Central Secretariat**

1, chemin  
de la Voie-Creuse  
Case postale 56  
CH - 1211 Genève 20  
Switzerland

Tel. +41 22 749 01 11  
Fax +41 22 733 34 30  
E-mail [central@iso.org](mailto:central@iso.org)  
Web [www.iso.org](http://www.iso.org)

ISBN 978-92-67-10599-4  
© ISO – November 2012



Contact the ISO member  
in your country:

[www.iso.org/isomembers](http://www.iso.org/isomembers)

