



Why Standards

By Michael A. Anthony, P.E., Derry Caleb, and Stanley G. Mitchell

When standards are absent, we soon notice. We care when products turn out to be of poor quality, are unreliable, or dangerous because of counterfeiting. When we place phone calls seamlessly across latitudes and time zones, it is because the International Telecommunications Union (ITU), formed in 1865, established transnational communication protocols still in use today. When a computer can be powered at either 120V or 220V outlets at either of 60 or 50 hertz, it is because the International Electrotechnical Commission (IEC), founded in 1906, established agreement among manufacturers of power supplies. More recently, in June 2011, the International Standards Organization (ISO) produced ISO 50001: Energy Management Systems to establish a framework that will likely influence up to 60 percent of the world's energy use¹.



Matter



One Country, One Vote



Figure 1. IEC/ISO/ITU members are national committees. They cannot force nations to comply with their standards. Instead they work to create consensus around particular solutions and argue that participation is more cost effective than not participating. This process resembles decision making at multi-lateral institutions—such as the United Nations or the World Trade Organization. The goal is to produce standards that can serve as a focal point for industry coordination or lead to a bandwagon process among adopters that benefits all nations.

These three sister organizations (IEC, ISO, ITU) are essentially the “United Nations” of national standards developing organizations. They provide the platform for consensus for global technology development for country-specific committees such as the American National Standards Institute and the British Standards Institute (see Figure 1).

The Geneva-based organizations add value to all nations because stakeholders everywhere realize enormous economies of scale when standards are globally developed and deployed. When appropriate, IEC cooperates with ISO (International Organization for Standardization) or ITU (International Telecommunication Union) to ensure that international standards combine all relevant knowledge of experts working in related areas.

Standards developing organizations (SDOs) provide the following benefits for any country:

- SDOs provide a forum for collective decision making and an alternative to standardization through market competition or government regulation.
- SDOs identify promising technical and economic solutions and play an important role in promoting their adoption and diffusion.

- SDOs provide the technical means by which political trade agreements are put in place when divergent national or regional standards create technical barriers to trade.

Standards-writing has been called a “wild mix of politics and economics.” Involvement in the direction of their development requires significant investment in expertise and relationships over a long period of time. The innovation that occurs in every nation is notorious for unpredictable, piecemeal-continuous development that frustrates political agendas. It seems counter-intuitive that getting everyone to do the same thing on a global scale leads to innovation.

However, as Simcoe² identifies in his research on the effect of the Internet on standards development, SDOs solve wicked coordination problems “by providing a forum where interested parties can seek a broad consensus before endorsing a particular technology and promoting it as the industry standard.” By positioning their products in relation to a common standard, firms grow the total size of the market, and can focus their innovation efforts in areas where they have a comparative advantage.

Standards are always in-progress, living documents that, by necessity, do not develop in step with each other, much as we

would like them to. They are complex and interdependent, made even more complicated by gaps in local authority, overlapping jurisdictions, or both. They are a Rubik's Cube of core, referenced, and spin-off documents in which a single noun or verb can move hundreds of millions of dollars.

Some of the specific ways standards create value for the educational facilities industry.

- They level the playing field for building industry suppliers and service providers so that resources are available from multiple sources.
- They provide public safety benchmarks for front-line enforcement authorities.
- Bonding agencies that finance building projects can be assured that a facility will conform to life-cycle expectations and can deliver on the promised revenue stream.

The CEO of a diversified multi-national manufacturing company and the executive facilities officer both reckon with standards, but in rather different ways. The CEO has only one or two standards to follow—frequently a product standard. They seek to set the standard for competitive advantage; continually “gaming” the intellectual property space, guarding their innovations in order to recover their research and development costs and to generate profit.

The facilities officer inhabits a rather different world. He or she is bound to a highly networked industry with complex interdependencies and requirements for multi-dimensional consensus. He does not have a cadre of patent attorneys protecting intellectual property though he is protecting the largest public investment any state makes; typically with grim resources. Much of the large electrical, telecommunication and environmental equipment installed in his or her campus is, for example, supplied by multi-national corporations that are at the meetings in world capitals where standards are written.

With gathering pace, as Derry Caleb writes in Sidebar 1, complex equipment that is installed at education facilities is made from parts that originate in manufacturing centers in all corners of the earth. These parts may only meet each other at job sites on our campuses for the first time and they do not always speak the same language. As Stan Mitchell writes in Sidebar 2, significant progress has been made toward solving this and other problems with a new international facilities management standard.

THE U.S. PERSPECTIVE

All nations recognize that industry-developed standards are superior to those developed by a central government. All aim to catalyze technological breakthroughs to advance national priori-

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Sidebar 1

The UK Perspective

Derry Caleb, Director of Estates, Surrey University

It is impossible for a director of estates/facilities or anyone in a delivery and operation role to operate without robust reliable standards that are relevant for today's infrastructure and general business. The role of an estate director includes the management of a vast range of activities from strategic planning, design of capital works, selection of plant and equipment and the operation of these activities and services. There is an expectation by my clients that when they enter buildings and use my services, everything is compliant and safe and that they will leave for home as well as they entered the premises that morning. The equipment used, the design of the buildings, the environmental performance, and the processes by which the business functions meets a certain range of standards.

The value of British and international standards is grossly underestimated. It reduces and in many cases removes from every design and planning activity the need to evaluate from first principles materials, quality, robustness, safety, and elements of design detail. It removes the cost of carrying out such evaluations and removes the risk associated with selection and operation of services. Modern buildings and services rely on the fact that some one has undertaken testing and evaluation in a holistic way delivery of compliant services, components, designs of plant equipment, and services of a range of activities that are a completely different skill set from that of a designer. Many design and build specifications and general contracts are only held together and fully reliant on standards to ensure the delivery is fit for purpose.

What is apparent to a manager is that standards are struggling to keep pace with the complex interactive nature of systems design and communications between FM software, metering systems, business management systems, and building management systems. This new world is best described by the need to review performance and link all manner of systems. Too often systems do not communicate together in areas where they should or the cost of producing interfaces is prohibitive. The globalization of manufacture, marketing, and supply chains means that cross-country standards are essential for the manufacturers, suppliers, users, and clients down the chain.

The use of standards as a barrier to protect companies IP or product has long passed and those that do not embrace the new methods of work and need from within the FM field for integration and communication will not survive in the long term. Suppliers operating closed systems cannot compete in the modern world whilst many have or are moving to more open systems. Recent experience in expanding and developing FM systems across a 200-building estate and multiple suppliers whilst trying to interface hundreds of meters to collect information on energy performance has been time consuming, frustrating, costly, annoying, and ongoing. The life expectancy of software and systems is an ongoing problem, and having sufficient technical staff who can work across multiple systems is challenging.

The FM business is reliant on robust, accurate, and timely information. The need to demonstrate performance is essential and therefore the interface between equipment monitoring, building performance, energy use, life-cycle performance, and staff performance is even more critical. The reliance on performance and quality and performance standards is essential.

ties. In the United States, standards developers such as NFPA, ICC, IEEE, ASME, and about 200 others inform the *single vote* the American National Standards Institute (ANSI) casts on behalf of the United States to the global standards-setting organizations in Geneva.

Recognizing that any industry will gravitate to the most cost-effective standardization structures, the U.S. federal government's National Technology Transfer and Advancement Act (NTTAA) was signed into law in 1995³. It is administered by the National Institute of Science and Technology (NIST) and reports to the Secretary of Commerce in the Executive Branch of the U.S. government. The NTTAA promotes the development of new standards by requiring that all federal agencies use privately developed standards before they try writing such standards themselves.

In an open memorandum originating from the Office of Science and Technology dated January 17, 2012, and directed to federal agencies with oversight of industries of strategic importance, stakeholders were reminded of the limits of the NTTAA:

The vibrancy and effectiveness of the U.S. standards system in enabling innovation depend on continued private sector leadership and engagement. Most standards developed and used in U.S markets are created with little or no government involvement...

*... In limited policy areas, however, where a national priority has been identified in statute, regulation, or Administration policy, active engagement or a convening role by the Federal Government may be needed to accelerate standards development and implementation to help spur technological advances and broaden technology adoption.*⁴

In other words, if the U.S. government is not satisfied with the pace or the direction that privately developed consensus documents are taking, it may aggressively "convene" in an industry's open and consensus-driven standards setting process. An example of potential U.S. government intervention would include U.S. Senate bill S.1000, entitled the *Energy Savings and Industrial Competitiveness Act of 2011*. This bill would empower the Secretary of Energy to establish goals of zero-net-energy for new commercial and residential buildings. If S.1000 is signed into law, existing standards vetted through the open process and which the Secretary does not believe will meet federal goals or targets, would be rewritten by the Secretary's office. What's more, if the body responsible for developing the standards does not comply with the Secretary's request (both ASHRAE and the ASHRAE 90.1 standard are specifically referred to within the bill's language), then the Department of Energy would

be empowered to close the process by removing and replacing existing standard(s) with a modified code as established by the Secretary.

Regulatory policy shapes the structure and conduct of all industries and sets in motion major shifts in economic value. The codes and standards that assert regulatory policy hasten trade flows between industries and nations. In many respects, regulation reflects an explicit, formal contract between businesslike enterprises and the society that supports them.

Even in the absence of laws and regulations, informal agreements may call upon our industry to meet specific social responsibilities and to take the measured risks that are essential to innovation. Command of the regulatory processes of the federal government, as well as in the privately developed standards world governed by IEC/ISO/ITU, allows complex industries such as ours to manage risk aggregations and meet the evolving needs of our respective institutions.

FORWARD

APPA's Code Advocacy Task Force (CATF) looks for the highest developed stage of technical capability regarding products, processes, and services, based on the relevant consolidated findings of science, technology and experience. It assesses whether the applicable standards are feasible from an overall cost standpoint and within the agreed risk tolerance of the industry. In the U.S. most of these standards are developed by NFPA, ICC, ASHRAE, ASTM, ASME, ASCE, AWWA, and others. (A complete listing is available at the CATF Web page⁵.)

By engaging the committees that write these documents, the CATF manages a large component of the cost structure of our industry. Half-percent savings here; half percent savings there; five to ten times a year across a hundred documents year-after-year—that soon adds up. Averaged over ten years, CATF standards intervention activity has avoided cost on the order of \$100 million per year in the United States. We need to expand and accelerate this trend. Table 1 describes two methods for doing this. At the moment, the Code Advocacy Task Force is implementing Method 2.

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Senior campus facility officers inherit a long conversation about the degree to which the assets under their stewardship contribute to the primary, academic mission of their institutions. APPA's activism at the international tables where product standards and installation codes are written will provide our industry with the following:

- Members will have the most current information for code and standard education programs
- Reduction in facility management cost associated with penalties levied by enforcement agencies
- Suppliers to the education facilities industry will have a deeper understanding of the educational facilities customer: a chance to innovate more closely around those needs, tighter monitoring of demand and supply chain – all key ingredients in meeting their own financial goals.

The cost of education is a broadening discussion in all nations. Adding to the sensitivities that surround curriculum and faculty, the architecture and condition of campus facilities are cited as cost drivers because new recreation centers, student life complexes, and administration buildings are politically visible. Less visible, however, is the competition among all universities worldwide for research projects that can be conducted anywhere on earth.

The most surprising standard of all may not ever be written but may always lie in the public eye. APPA member institutions are engaged in policy initiatives that require them to confront the cost of value-delivery that is expensive relative to available resources. All levels of government are under pressure to use intergovernmental collaboration to spread the cost of managing educational facilities across wider tax bases; capitalizing economies of scale or economies of skill inherent in some services.

Sidebar 2 The Global Perspective

Stan Mitchell, Chairman ISO TC 267 Facilities Management Committee⁷

The establishment of a new ISO Technical Committee for Facilities Management has recently been announced, and ISO TC 267 will hold its inaugural meeting 21 to 23 November 2012 in Berlin, Germany.

Whilst the full remit of this committee is yet to be determined by the committee itself, the initial work items already communicated include the review of the first two European Standards BS EN 15521-1 'Facility Management - Terms and Definitions' and BS EN 15221-2 'Guidance on How to Prepare Facility Management Agreements.' These standards were developed by the collective efforts of 28 European countries in 2006. The Technical Committee responsible for their creation, CEN TC 348, has agreed that these should now be passed over to the new ISO Committee for further review and publishing as ISO standards.

Whilst at the time of writing the first meeting of this committee has yet to take place, already those countries who have indicated a willingness to participate (as opposed to observer status, of which the United States is one) makes interesting reading and includes Austria, Australia, Canada, China, Czech Republic, Denmark, Finland, France, Germany, India, Japan, Malaysia, Norway, Republic of Korea, Spain, Thailand, and UK.

Most would agree not just an interesting mix of those countries that have already made the commitment to participate but also an indicator regarding the growing awareness and understanding of Facilities Management as a strategic professional discipline as opposed to an outsourced service delivery mechanism as many would have you believe!

Table 1. Two Methods

Comparison of two methods for developing education facilities industry leading practice documents	Advantages	Disadvantages
Method 1: APPA is granted ANSI accreditation and installs standards-developing infrastructure	ANSI-accreditation is understood by all industries and governments. Gain in brand visibility by sponsorship of best practice. Strategic influence of standards on emergent technologies	Costliest. It will take 3 to 12 years for these products to track in public law.
Method 2: Merge APPA leading practice into parts of existing ANSI-accredited documents and a suite of co-logoed documents	Lowest cost. Safety and economic concepts are quickest to track in state and local law	Significant coordination of APPA volunteer resources with existing ANSI-SDOs

Code and standard advocacy with like-minded organizations will do more than create new value propositions with new synergies; they will change the logic of our industry's relation to other trade associations and APPA business partners. These organizations—and their supporting memberships—benefit from access to the education facilities market. Selective alliances will transform APPA into a central character—one that is well positioned in a web of relationships and controls the vital links to the value chain of our industry.

Our industry must hasten its effort to write its own rules, or, as the memorandum from the chief technology officer of the United States suggests, we will have them written for us. As the existence of 200-plus national members of the ISO/IEC/ITU indicate, every government on earth recognizes that top-down government intervention has never proven as effective a way to meet their strategic technological goals as simply creating the conditions within which industries may regulate and innovate for themselves. ⑤

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Mike Anthony is regulatory advisor to the University of Michigan Plant Operations, Ann Arbor, MI, and a member of the APPA Code Advocacy Task Force; he can be reached at maanthon@umich.edu. Derry Caleb is director of estates of Surrey University, United Kingdom, and a past president of the Association of University Directors of Estates; e-mail him at d.caleb@surrey.ac.uk. Stanley Mitchell is CEO of Key Facilities Management International, Doune, UK. He chairs the ISO TC 267 Committee and the BSI Facilities Management Committee; he can be reached at info@key.fm. This is Caleb and Mitchell's first article for *Facilities Manager*.

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