

1. INTRODUCTION

1.1

Labels and Standards in Context

Nations traditionally classify their final energy consumption into three sectors—buildings, industry, and transportation. In residential and commercial buildings, energy is consumed by appliances, equipment, and lighting. In homes around the world, energy is consumed by everything from refrigerators and clothes-washing machines to garbage compactors and desktop computers, all in ever-increasing numbers. In office buildings, energy is consumed by everything from computers and copiers to water coolers and photosensor-controlled lighting, also in ever-increasing numbers. Heating and cooling equipment—often out of sight—is a collection of energy-consuming equipment as well. The energy-efficiency labeling and standards-setting programs described in this guidebook are intended to reduce the energy consumption of all of these products without diminishing the services they provide to consumers.

Worldwide, people consume 422 Exajoules (EJ) or 400 quadrillion British thermal units (Btus) of marketed energy. This energy consumption contributes about 25 to 30% of energy-related CO₂ emissions, accounting for 26% of all anthropogenic CO₂ emissions and 14% of our net contribution to climate change from all greenhouse gases (Wiel 1998). The use of energy in human activities related to buildings, including the use of appliances, equipment, and lighting, accounts for 42% of total energy consumption (including the use of biomass) and 36% of total energy-related CO₂ emissions. Industrialized countries consume half of this energy; the remainder is consumed by the rest of the world (Price et al. 2005).

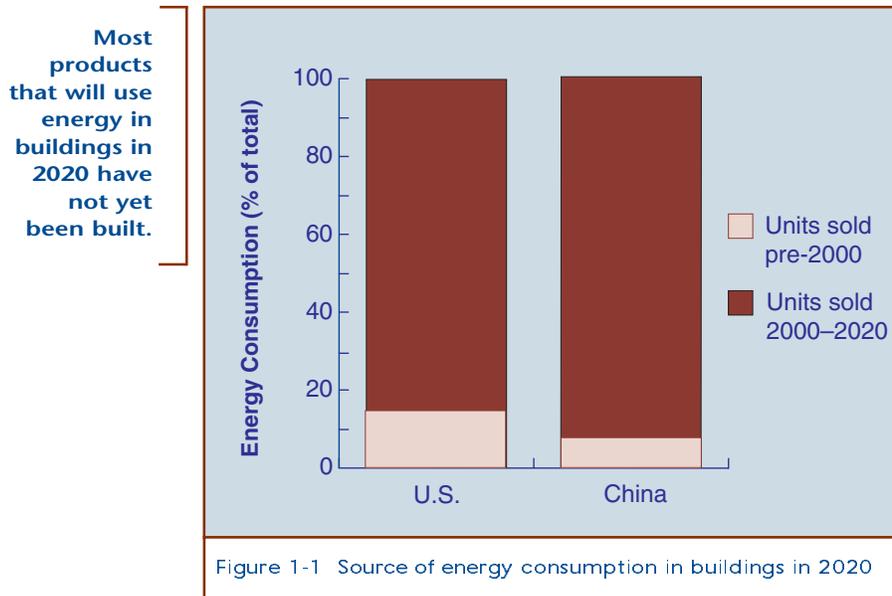
The above numbers are a snapshot of today's energy use patterns; what's ahead? Recent (1995 to 2002) annual average growth rates in primary energy use in buildings range from around -0.3% in Eastern Europe and the former Soviet Union countries to over 6% in the commercial sector of the developing Pacific Asian nations. On average, energy use in buildings is growing by about 2% per year worldwide, and the rate of growth has increased since 1995 (Price et al. 2005). Such continued growth in energy use in buildings is likely to contribute to overstressing many already stressed economies and environments around the world.

Energy growth rates will vary among nations according to structural differences in their economies (demographics, industrial composition, economic growth) and differences in the energy services that each energy consumer chooses or desires to purchase. In the building sector, these differences in

preferred energy services are affected by varying climates, construction methods, and cultural habits. Each country can accommodate its natural growth in the demand for energy services by some combination of supplying more energy and improving the efficiency of energy consumption. In all sectors, improving energy efficiency before increasing energy supply is generally the more economically efficient national strategy. A portfolio of energy policies is available to governments for this purpose, including strategic energy pricing, financing and incentive programs, regulatory programs, government purchasing directives, and consumer education.

Improving energy efficiency in the residential- and commercial-buildings sectors not only saves money and reduces pollution but also improves the indoor environment of homes and the productivity in commercial buildings. Energy-efficiency labels and standards for appliances, equipment, and lighting offer a huge opportunity to improve energy efficiency and are especially effective as an energy policy. Government labeling and standards-setting programs can affect most of the energy that will be used in buildings just two decades from now. As Figure 1-1 below indicates, most of the energy-consuming products that will account for building energy use 20 years from now have not yet been built.

Well-designed mandatory energy-efficiency standards transform markets by removing inefficient products, with the intent of increasing the overall economic welfare of most consumers without seriously



limiting their choice of products. Energy labels empower consumers to make informed choices about the products they buy and to manage their energy bills. Perhaps the most dramatic example in the world of the effectiveness of energy-efficiency standards and labels is the transformation of the refrigerator market in the U.S. The average new refrigerator sold in the U.S. today uses, per year, only a quarter of the electricity that would have been used by a refrigerator sold 30 years ago when standards and

labels were first introduced, despite the new product's increased size and added features. Such improvements in energy efficiency not only improve a nation's economic efficiency and foreign trade, they also enhance people's lives by lowering consumers' energy bills and making energy services more affordable, enhancing labor markets, and improving public and environmental health. Labels and standards are appropriate for most cultures and marketplaces; therefore, the authors believe that energy-efficiency labels and standards deserve to be the cornerstone of any country's balanced portfolio of energy policies

and programs. Often, benefits similar to those from mandatory standards can be achieved by voluntary labels and other voluntary energy-efficiency programs, and opinions sometimes differ on which type of program should be considered first. The specific extent to which labels and standards should be applied and the balance of programs that will most effectively limit energy growth and at the same time stimulate economic growth will depend on individual national circumstances and other considerations discussed in this guidebook.

1.2

Purpose of This Guidebook

The authors have written this guidebook to assist policy makers and the institutions they represent in introducing energy-efficiency labeling and standards-setting programs for appliances, equipment, and lighting products and maintaining these programs effectively over time.

Policy makers will be faced with many difficult questions in the course of developing and maintaining labels and standards-setting programs. The guidebook is designed to assist policy makers in:

- determining whether a labeling or standards-setting program is right for their countries and, if it is, determining what combinations of programs and products are appropriate
- designing, developing, implementing, and maintaining labels and standards
- understanding the data; facilities; and cultural, political, and human resources necessary to reach their goals
- learning about existing field experience with energy-efficiency labeling and standards (through case examples and references)

One goal of this guidebook is to introduce the key steps in the standards-setting and labeling processes and to give a detailed explanation, based on collective experience, of the most direct and effective ways to undertake those steps. Many of the steps discussed can be harmonized with parallel activities of international organizations and other countries in the region and can be undertaken at relatively modest cost, resulting in significant economic and environmental benefits.

Except when discussing other government energy policies related to labeling and standards (Chapter 10), the guidebook does not address the building codes that are prevalent in most industrialized countries, throughout Southeast Asia, and elsewhere around the world, nor does it address energy-efficiency standards or labels for industrial processes or transport.

1.3

Modifications in the Second Edition

During the three years since the first edition of this guidebook was published, there has been increasing activity in standards-setting and labeling around the world. Labeling and standards in numerous countries have broadened their coverage to include new products such as electric motors, commercial

lighting, and electric transformers. New standards have been introduced, and old standards have been updated to be more stringent. New labels have been introduced, and old labels have been redesigned to be more influential. The authors feel that the time is appropriate to share with the readers of the guidebook the news of shifting emphasis and progress in the field.

This second edition contains the same core material as the first edition, but the authors have updated examples and citations to dated material and clarified the text as needed. In addition, we have modified the book in four noteworthy ways. First, we have added a new Chapter 7 on public information campaigns (inserted just before the original Chapter 7) because an information campaign is an important element of standards-setting and labeling programs that was underemphasized in the first edition. Secondly, Chapter 5 on label design now crisply distinguishes between the development of comparison labels and the development of endorsement labels and overcomes a previous underemphasis on endorsement labeling. Thirdly, Chapter 8 has been retitled and significantly revised to address verification and compliance more broadly than in the first edition. Finally, throughout the book, the authors have described and given references to the dramatically increasing attention that nations around the world are paying to regional efforts to align and harmonize various elements of standards-setting and labeling programs, especially the adoption of testing protocols and mutual recognition of test results.

1.4 How to Use this Guidebook

The guidebook presents core concepts likely to be useful to people responsible for:

- considering whether or not to initiate an energy-efficiency labeling and/or standards-setting program
- designing the program
- implementing the program, and/or
- monitoring, enforcing, and maintaining the program

The remainder of the guidebook is organized as follows:

- **Chapter 2** is a stand-alone summary, similar to a Synopsis or an Executive Summary, of the entire volume.
- **Chapter 3** explores the many factors that are useful to consider when deciding whether to regulate the energy efficiency of any energy-consuming product or to require or encourage the provision of standardized and accurate information about its energy efficiency. Chapter 3 also discusses political, institutional, cultural, regional, technical, and economic factors that affect how successful or desirable such a program might be in various countries.
- **Chapters 4, 5, 6, and 7** describe the mechanics of labeling and standards programs, focusing on product testing (Chapter 4), label design (Chapter 5), standards analysis and determination of standards levels (Chapter 6), and communication campaigns (Chapter 7).

- **Chapters 8 and 9** address operation and maintenance of labeling and standards programs; Chapter 8 focuses on maintaining and enforcing labels and standards and Chapter 9 on evaluating their impacts.
- **Chapter 10** recognizes that the most effective national energy strategies are robust aggregations of many energy policies designed to transform markets and discusses how energy-efficiency labels and standards fit into a comprehensive national energy strategy.

Each chapter begins with “Prescriptions.” These are the fundamental lessons that the more than 50 contributing authors and reviewers have learned from their many years of experience—the essential features of a successful energy-efficiency labeling and standards-setting program.

Chapters 2 through 9 each contain flow charts showing the basic steps in the relevant aspect of labeling or standards-setting that is addressed in that chapter. Together these flow charts make up a checklist of the many actions necessary to undertake a successful program of energy-efficiency labeling or standards.

Throughout the guidebook, the authors use the phrases “labels and standards” and “labeling and standards-setting” to refer broadly to programs that include any combination of mandatory or voluntary energy-efficiency labels, labeling, standards, and standards-setting. When our descriptions or prescriptions apply narrowly, we note which particular categories of programs we are addressing.

This guidebook and a comprehensive set of complementary support tools and resources are available on the Collaborative Labeling and Appliance Standards Program (CLASP) website: www.clasponline.org. Versions of the first edition of this guidebook in Spanish and Korean can be downloaded from the CLASP website. A version of the first edition in Chinese can be obtained by contacting CLASP at cegan@clasponline.org.

