



Southwest Energy Efficiency Project

Saving Money and Reducing Pollution through Energy Conservation

GOING BEYOND CODE

A Guide to Creating Energy Efficient and Sustainable Buildings in the Southwest

Executive Summary

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Executive Summary

Introduction

There are many state and local jurisdictions in the Southwest region that have developed programs and policies to promote energy efficient building practices, more stringent building energy codes, and green building initiatives. These jurisdictions are either actively developing so-called “beyond code” requirements, or are interested in incorporating one or more elements of voluntary programs into the mandatory codes. Factors driving interest in beyond code programs and policies include the region’s rapid growth rate, local and regional interest in advancing “green building” practices (e.g., the United States Green Building Council’s (USGBC) Leadership in Energy and Environmental Design (LEED)), and heightened concern about climate change and rising energy costs.

Effectively implementing a beyond code program can be challenging for state and local governments. These challenges include industry opposition, difficulties in deciding what programs and performance criteria to use, and conflicting agendas of those involved, (e.g., elected officials, planning and development staff, building permitting and code enforcement officials vs. building industry stakeholders).

The purpose of the Guide is to help state and local governments by:

1. Reviewing and analyzing successful beyond code programs;
2. Evaluating national beyond code programs and standards, and their applicability to states and localities; and
3. Providing guidance for beyond code programs, including model code elements for new residential and commercial buildings.

Beyond Code Programs in the Southwest

The Guide describes fourteen beyond code programs and policies that communities have adopted or are in the process of adopting in the Southwest, shown in Table ES-1. They are representative of the range of approaches used by communities for establishing beyond code requirements, including mandatory programs (e.g., City of Boulder); voluntary, point-based programs (e.g., City of Scottsdale); and hybrid programs that combine mandatory requirements with incentives (e.g., Eagle County). The Guide includes a few notable beyond code programs outside the SWEEP region, including Rohnert Park, California, and Austin, Texas. The programs featured in this Guide represent a wide range of program designs, climate zones, and demographics.

Table ES-1. Summary of Beyond Code Programs in the Southwest

Jurisdiction <ul style="list-style-type: none"> • Year adopted • Voluntary or Mandatory 	Program Name / Description	Municipal	Residential	Commercial
Buckeye, AZ <ul style="list-style-type: none"> • 2008 • Voluntary 	<i>Buckeye Green Building Program</i> This is a comprehensive points-based program. Home size determines the number of points needed to achieve each level of certification.		•	
Chandler, AZ <ul style="list-style-type: none"> • 2008 • Voluntary (Mandatory for Municipal) 	<i>Chandler Green Building Program</i> The program outlines a comprehensive approach including modification of building and zoning codes, creation of green building standards, incentives for green building certification, and city commitment.	•		•
Pima County, AZ <ul style="list-style-type: none"> • 2008 • Voluntary 	<i>Pima County Residential Green Building Program</i> Pima County’s comprehensive, point based program is voluntary. Home size determines the number of points needed to achieve each level of certification. The program is designed to coordinate with ENERGY STAR, utility incentive programs, and the federal new home tax credit.		•	
Scottsdale, AZ <ul style="list-style-type: none"> • 1998 • Voluntary (Mandatory for Municipal) 	<i>Scottsdale Green Building Program</i> Scottsdale’s comprehensive, point based program is voluntary. Home size determines the number of points needed to achieve each level of certification. Parallel residential and commercial programs were adopted. LEED Gold is required for municipal buildings.	•	•	•
Las Vegas Region, NV <ul style="list-style-type: none"> • 2006 • Voluntary 	The Southern Nevada Green Building Partnership is a voluntary program that was designed by the Southern Nevada Homebuilders Association (SNHBA) to benefit jurisdictions, homebuyers and builders.		•	
Rohnert Park, CA <ul style="list-style-type: none"> • 2007 • Mandatory 	<i>Rohnert Park Green Building Program</i> Rohnert Park’s Green Building program is mandatory for all new residential and commercial buildings. The stringency of both residential and commercial compliance requirements is based on building size. The program is based on “Build It Green” for residential projects, and LEED for commercial buildings.	•	•	•
San Bernardino County, CA <ul style="list-style-type: none"> • 2007 • Voluntary (Mandatory for Municipal) 	<i>Green County San Bernardino</i> The program includes a number of incentives to encourage residents, builders, and businesses to adopt more sustainable practices. Builders whose homes meet the California Green Builder standard will receive expedited plan checks, guaranteed timelines, and priority field inspection service. Municipal buildings must be certified as LEED Silver.	•	•	•

Jurisdiction <ul style="list-style-type: none"> Year adopted Voluntary or Mandatory 	Program Name / Description	Municipal	Residential	Commercial
Albuquerque, NM <ul style="list-style-type: none"> 2007 (not adopted) Mandatory 	<i>Albuquerque Energy Conservation Code</i> Adopting and amending the IECC, Albuquerque wrote their own prescriptive code, with energy efficiency requirements well above those in the model code. Additionally, municipal buildings must be certified as LEED Silver. Albuquerque's energy code is being challenged in court because the minimum HVAC efficiencies exceed the nationally allowed minimums.	●	●	●
Albuquerque, NM <ul style="list-style-type: none"> 2008 Voluntary 	<i>Albuquerque Green Path Program</i> This high profile, voluntary program offers recognition for high performing, comprehensively sustainable buildings.		●	●
City of Boulder, CO <ul style="list-style-type: none"> 1998; updated in 2008 Mandatory 	<i>City of Boulder Green Points Program</i> The City of Boulder recently updated their comprehensive, points-based program. Home size determines the number of points needed to achieve each level of certification. A commercial energy code program will become effective in March 2009.		●	●
Boulder County, CO <ul style="list-style-type: none"> 2008 Mandatory 	<i>Boulder County BuildSmart Program</i> This mandatory program focuses on energy and water efficiency as well as recycling and reuse of building materials. The level of compliance is tied to the square footage of the residence. A commercial green building program is being considered.		●	
Northern Nevada Region, NV <ul style="list-style-type: none"> Draft, Aug. 2008 Voluntary 	<i>Nevada Sierra Green</i> This Homebuilders Association standard is comprehensive, voluntary, and completely separate from the jurisdiction's permitting and inspection process.		●	
Santa Fe, NM <ul style="list-style-type: none"> Draft, November 2008 Mandatory 	<i>Santa Fe Residential Green Building Code</i> The draft of Santa Fe's comprehensive, point based system is under review. Home size determines the number of points needed to achieve each level of certification. A HERS rating is also required for all new homes.		●	
Eagle County, CO <ul style="list-style-type: none"> 2006 Mandatory 	<i>Eagle County ECObuild</i> Eagle County's comprehensive, point based program is mandatory. Home size determines the number of points needed to achieve each level of certification. Buildings exceeding minimum standards are eligible for permit fee reimbursements from Eagle County.		●	●

Jurisdiction <ul style="list-style-type: none"> Year adopted Voluntary or Mandatory 	Program Name / Description	Municipal	Residential	Commercial
City of Aspen/Pitkin County, CO <ul style="list-style-type: none"> 2002; update in progress Mandatory 	<i>City of Aspen/Pitkin County Efficient Building Code (AP 2030)</i> The proposed AP 2030 Efficient Building Code is a prescriptive beyond code program for new residential and commercial construction. Home size dictates the number of points and level of energy efficiency required in this comprehensive program.		●	●
Summit County, CO <ul style="list-style-type: none"> 2008 Mandatory 	<i>Summit County Sustainable Building Ordinance</i> The Summit County Sustainable Building Ordinance is a points-based green building program that is mandatory for new residential construction in Summit County, and local jurisdictions within the County.		●	

Municipalities have taken a range of approaches to developing beyond code programs. They include voluntary or incentive-based programs, mandatory programs, or a combination of the two. The programs, however, share several common elements. These include:

- Clearly established goals that are supported by elected officials and staff within the jurisdiction;
- Prescriptive energy efficiency criteria that go well beyond model code, performance based standards that are tied to a measurable level above the 2006 IECC, or other standard (e.g., LEED);
- One or more internal champions willing to spearhead the development and implementation of programs;
- Stakeholders’ involvement in the decision making process;
- Integration across local government departments and functions (e.g., planning, zoning and building permitting and inspection);
- Incentives to encourage projects to go well beyond minimum requirements; and
- Extensive communications and outreach, partnerships with the building industry and nonprofit groups, and training and education.

Energy Savings and Cost Effectiveness of Beyond Code Programs

The potential electricity and natural gas savings from adopting beyond code programs in the Southwest is significant. If all states in the Southwest were to adopt a 30% more stringent energy code (versus the 2006 IECC), the region would cumulatively save 15,700 GWh in electricity by 2020, and 100 million

dekatherms of natural gas.¹ The electricity savings are equivalent to the electricity supplied by about 2,270 megawatts of electricity, meaning that the region could avoid building approximately five medium-sized (450 MW) new power plants. This is equivalent to the electricity use of approximately 1.6 million homes. States and communities in the Southwest could achieve additional energy savings by gradually updating building codes as new technologies and advanced building design practices are introduced into the marketplace.

Furthermore, adopting requirements that go well beyond current building energy codes (e.g., a 30% increase over the 2006 IECC) would cumulatively achieve more than \$13.5 billion in net economic benefits throughout the region by 2020, shown in Table ES-2. These benefits would continue to accrue year after year, as the efficiency measures installed in homes and commercial buildings continue to deliver energy savings over the lifetime of the building.

Table ES-2. Cumulative Net Economic Benefits of Adopting more Stringent Residential and Commercial Energy Codes in the Southwest: 2009 – 2020

<i>State</i>	<i>Lifetime value of energy savings</i>	<i>Total invested in efficiency measures</i>	<i>Net economic benefits</i>
Arizona	\$7,116	\$3,241	\$3,875
Colorado	\$6,651	\$2,878	\$3,774
New Mexico	\$2,266	\$980	\$1,285
Nevada	\$5,404	\$2,338	\$3,066
Utah	\$2,605	\$1,127	\$1,478
Wyoming	\$172	\$74	\$97
Region	\$24,213	\$10,638	\$13,575

Table notes: The unit is millions, 2008 \$. The analysis assumes a 30% increase in energy efficiency of new residential and commercial buildings, relative to the 2006 IECC. Analysis by SWEEP.

Recommendations for State and Local Officials

SWEEP makes the following recommendations to jurisdictions developing beyond code programs. Each recommendation is described in more detail in this report, with supporting information and examples from programs implemented by one or more jurisdictions.

Establish Goals with Measurable Objectives: Develop specific comprehensive goals for beyond code programs, with clear, measurable objectives. At the local level, goals are typically established by elected officials with support from municipal planning and building departments, and codified through local ordinances. State goals can be established through an executive order issued by the governor, or via legislation enacted by the state legislature.

Convene a “Beyond Code” Task Force: Begin with a task force that includes, at a minimum, affected government agencies and departments, building efficiency professionals, environmental advocates, and representatives from the building industry. Consensus building from the beginning is a valuable investment in time. Although organizing a task force will involve additional effort, experience has shown

¹ The analysis of energy savings and net economic benefits from adopting more stringent building energy codes was prepared by SWEEP. A description of the analytical methods and assumptions used to estimate the energy savings and costs and benefits of adopting more stringent building energy codes is provided in Chapter 5.

that it will ultimately lead to a stronger and more effective program that is supported by multiple stakeholders.

Integrate the Program Across Departments: Provide training to familiarize staff with the requirements of the program, including alternative compliance options such as LEED or performance-based standards. Staff should be able to provide direction and support to applicants seeking third party verification as well as compliance with local program requirements. Ensure that all involved departments (including planning, building, and local water and power utilities) are familiar and conversant with the program, and prepared to implement the program. Develop and circulate to staff and applicants the steps and procedures for compliance and certification of projects, appeals, and any available incentives.

Develop and Provide Education and Outreach Materials: Provide educational materials and training sessions for the public, developers, and the building industry. Consider developing a lecture series or series of courses or workshops on energy and resource-efficient building practices, and providing program specific training for the building industry. The beyond code program should be supported by a communications plan that involves partnerships with the community.

Conduct a Strategic Marketing and Outreach Campaign: Develop a marketing program that will educate the public on the value of homes or businesses built to the program's standards. Help provide visibility for program participants through website coverage, press releases, newspaper advertisements, or announcements on municipal websites, and signage at building sites.

Develop Strategic Partnerships: Identify potential partners among civic and professional organizations, colleges and universities, libraries, utilities, and other organizations whose goals parallel those of the program. Develop strategic partnerships with those groups to help achieve the program's objectives, review progress, educate the public, and disseminate results.

Establish Minimum Building Energy Efficiency Criteria:

In the residential sector, leading jurisdictions have established minimum criteria that are 30 – 50% beyond minimum code requirements for single-family homes, and 15 – 30% more stringent for multi-family homes. A few jurisdictions (e.g., City of Boulder, Boulder County, and City of Aspen) have adopted more stringent requirements for larger homes, including minimum HERS ratings that go well beyond standard building practices and minimum code requirements. Some jurisdictions choose to adopt the ENERGY STAR New Homes guidelines as the minimum residential compliance threshold for new homes.

In the commercial sector, jurisdictions are pursuing minimum performance standards that exceed the model commercial energy code (ASHRAE 90.1-2004) by 15 to 30%.² A few states and municipalities have developed or adopted performance-based targets, such as Architecture 2030, which establishes a goal of achieving carbon-neutral buildings by 2030.³

Develop a Comprehensive Program: Since the advent of the Model Energy Code (precursor to the IECC) and California's Title 24, states and communities have primarily focused their code development efforts on energy efficiency. States and communities, however, are broadening their approach to sustainability, encompassing multiple environmental concerns, such as materials use and disposal, siting

² The USGBC's LEED program requires a minimum of 14% increase in energy efficiency. ASHRAE has proposed a 30% improvement in its commercial energy standard, 90.1- 2010.

³ Architecture 2030. www.architecture2030.org. Other examples of states and municipalities that have adopted carbon-neutral goals for buildings include the State of California, City of Austin, Texas, and the City of Seattle.

and transportation impacts, and other considerations. For example, the State of California recently adopted a statewide green building code, which will supersede its long established Title 24 energy code. The majority of new beyond code programs are taking a comprehensive approach, addressing issues such as land use, transportation issues, materials resources and sustainability, and the relationship of the building to the built environment.

Comprehensive programs can lead to increased energy efficiency in community and neighborhood design, and offer a broader scope of sustainability, as shown in Chapter 4. Comprehensive programs encourage energy efficient neighborhood development and site layout, providing a better starting point for a more energy-efficient structure. For more information on comprehensive programs, see Chapter 4.

How to Use this Guide

This guide is designed to serve as a resource for states, local jurisdictions and other organizations that are interested in developing and implementing beyond code programs. Jurisdictions that have already adopted beyond code programs can use the guide when making revisions or updates to their programs. The guide provides detailed information on many beyond code programs, with analysis and recommendations for program design, implementation and review and evaluation.

There are several types of information within this guide, from broad policy guidance to specific energy efficiency programs and sample ordinances. The guide is organized by program implementation stages.

Contents of the Guide

The guide contains the following chapters:

Chapter 1 – Introduction: Defines “beyond code,” and offers suggestions on how to use this guidebook.

Chapter 2 – An Overview: Describes what types of beyond code programs have been adopted, along with their general goals and objectives.

Chapter 3 – Developing an Effective Beyond Code Program: Design and Implementation Strategies: Details policy paths and decisions jurisdictions made to develop and implement successful programs.

Chapter 4 – Designing Beyond Code Programs: Details the types of measures jurisdictions use to increase energy efficiency, conserve water, promote sustainable development, and reduce waste, and operate and maintain buildings to ensure energy efficiency.

Chapter 5 – Energy Savings and Cost Effectiveness: Provides examples of high performance homes and commercial buildings, and analyzes the cost effectiveness and savings potential of beyond code programs. Included is a calculation for potential kWh and therms saved in new homes and businesses. Examples of high performance homes and mid-size commercial buildings, and the measures used to increase the energy efficiency in each are explained.

Chapter 6 – Model Codes and Standards: Provides sample model examples of performance and prescriptive paths to achieve an average of 30% efficiency over the 2006 International Energy Conservation Code (IECC) for residential construction, and 30% above ASHRAE Standard 90.1-2004 for commercial buildings. This chapter also includes specific guidance on how to integrate national standards, such as LEED, ENERGY STAR, the Home Energy Rating System (HERS) Index, New

Building Institute's (NBI) Core Performance Guide, and ASHRAE Advanced Energy Design Guides into state and local programs.

The appendices include a list of acronyms, summaries of beyond code programs and contact information by jurisdiction; model ordinances and checklists from communities that have adopted beyond code programs; and other reference documents that can serve as resources for jurisdictions developing or updating their beyond code programs.