The Value and Impact of Building Codes

This paper looks at the **big picture** of building codes and presents our perspective (as non-code experts, but with significant combined experience in policy issues related to building science, energy, technology and standards development) on why they are valuable. Because state legislators will be a key audience, we note why it is in the best interest of states to adopt codes developed by a uniquely American, democratic, **national/state/local process**. We discuss safety in terms of the need to **adopt and enforce current safety and health codes**, as well as the **growing demand for stronger model codes** and "reach" codes/standards to improve **building and community resiliency** in the face of more frequent and intense storms. We also discuss the **value of energy codes** such as the IECC in terms of their relationship to health and safety codes and role in reducing building operating costs and greenhouse gas emissions. The environmental benefit is also related to **"climate resiliency,"** which the U.S. Conference of Mayors and others have identified as a national priority. Because the 2012 IECC has been a specific target for code opponents, we try to address some of their concerns, such as that "energy codes cost too much." Similarly, we discuss why the **three-year cycle of updating model codes** is so important. In short, building codes are the most effective, least expensive way to protect public health, safety and welfare. They are more valuable now than ever before.

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I. Executive Summary

Building codes address many of a society's most important concerns, including public health and safety, and environmental protection. Because they are developed by a democratic and deliberative process that applies improvements incrementally, the building codes also address cost efficiency and investment value. In large part, building codes establish a building's quality, safety and energy performance for years to come, because initial design and construction decisions determine operational and maintenance costs for the life of the building. Building equipment and other components may be replaceable and upgradeable, but many aspects of building performance are "designed in" at the beginning, and are too expensive and difficult to change. Foundations and other parts of the building envelope are typically in place for 50 years or more. Building codes and design and construction decisions affect us every day. Some requirements such as fire safety codes and structural and seismic standards affect us in obvious ways. Others, such as lighting quality, acoustics and the air we breathe also have major effects on our health and productivity. We spend nearly 90 percent of our lives inside buildings, according to the U.S. Environmental Protection Agency, which is why the EPA is concerned about the impact of indoor air quality on public health.[i]

Model codes, a set of minimum requirements for building design, construction and operation to protect public health, safety and the natural resources that sustain us, help us "build it right" at the beginning when it matters most. Building codes can now offer enhanced protection against the threats of natural disasters and terrorism to make our communities more resilient, sustainable and livable for generations to come, which lowers the price of mitigation for building owners. Model codes provide guidance on how to design, build and operate buildings to achieve these goals. They also provide an insurance industry grappling with the effects of climate change and extreme weather with a baseline for estimating and managing risk. This helps to control or lower the cost of insurance premiums. But model codes are effective only if they are enacted into law and enforced by state and local governments.

The U.S code development process is unique in the way it brings together all interested parties to participate and decide what is needed and feasible for the construction of new buildings. This cost-conscious, triennial look at what a safe building can be and how it should perform provides savvy builders and building suppliers with critical information on what consumers want and where the market is headed. Model codes allow building suppliers to target a national market. Since markets for building materials and technologies are becoming increasingly international, U.S. manufacturers require a strong domestic base in which to develop the new products they need to compete. Regularly upgraded building codes ensure new products and practices make their way into buildings when the time is right and are no longer experimental. The code development process assesses the technology landscape and consumer demand, and creates a model code that can apply innovations gradually across the building sector, reducing the risk for individual builders and contractors. The process of updating model codes every three years is optimal to ensure new technologies, materials and methods, as well as better approaches to health and safety, can be incorporated into the next generation of buildings with sufficient time for proof of performance. Regular, incremental improvements help us continue to build better, and smarter, buildings as cost effectively as possible. Waiting longer between code updates

means many buildings are not current when built, and innovative American building suppliers are without a domestic base to sustain their innovations.

The new energy codes are making a major contribution toward solving our energy problems. The average American building wastes far too much energy because it was not designed and constructed with energy efficiency as a priority. This is unacceptable at a time when best practices for sustainable design are widely known and taught, when energy efficient appliances and equipment are a growing percentage of suppliers' and retailers' inventories, and given the multiple benefits of reducing our energy consumption. Buildings consume vast amounts of natural resources, accounting for about 40 percent of total U.S. energy consumption and 40 percent of U.S. greenhouse gas emissions.[ii] All that consumption (and waste) unnecessarily costs home owners and building owners billions of dollars each year, which is both ironic and inexcusable in times of budgetary and economic stress. Buildings constructed under the 2012 IECC will close a significant portion of the gap between how energy efficient the average building is and how efficient it could be.

Updated model codes benefit the communities that use them. Ultimately, jurisdictions enforcing current codes demonstrate they are forward thinking and open to change that improves lives. Likewise, jurisdictions choosing to lag behind current safety and energy codes demonstrate stubbornness less attractive to newcomers and those who invest in the most desirable types of economic development opportunities.

Updated codes that produce a more valuable building should benefit builders in addition to owners. On the residential side, the relatively small percentage increase in construction costs for homes built under updated codes is more than offset by improved quality and safety. Likewise, a home costing less to own and operate should produce a higher return at sale and resale. Builders are right to be concerned that U.S. mortgage underwriting standards do not enable appraisers and lenders to properly value enhanced efficiency and safety features. Outdated housing policies need to be revised if we want the fledgling green building market to take off. That said, critics who complain about the cost of mandatory building codes and the three-year cycle of keeping them up to date should consider this: If all jurisdictions adopted the most current code as a minimum requirement, there could be no competitive disadvantage for the code-compliant home or building. Model codes ensure consistency among jurisdictions, while permitting states and local authorities to make adjustments based on specific conditions. State and local policymakers should also consider: the cost to public health and safety from design flaws or improper installation; the unnecessary cost to home owners, businesses and taxpayers from buildings wasting energy and water; that training is widely available on design and construction practices for achieving higher quality and better performing buildings meeting or exceeding code requirements at little or no additional cost to builders; the higher sale prices safe, healthy and energy efficient homes and buildings can command; and the savings to homeowners when disaster hits if homes are resilient and meet current flood-protection requirements, seismic design standards and wind-bracing requirements.

Enforcing current building codes keeps more dollars within local economies. Complementary policies such as demand-side management also can reduce the need to build additional power plants. The U.S.

Department of Energy estimates energy efficiency improvements in the 2009 and 2012 International Energy Conservation Code (IECC) pay for themselves in one to two years, leaving the average homebuyer with a windfall of hundreds of dollars in energy savings every additional year he/she owns the home.[iii] During the period of a 15-, 20- or 30-year mortgage, these savings go to homeowners instead of power companies, thus stimulating local economic development. The European experience shows buyers who understand these benefits are willing to pay a premium for better construction. They also may have the help of innovative financing products, which, as noted above, are only starting to be used in the United States. Updated codes also mean updated standards. Because codes incorporate by reference many voluntary consensus standards, the American public gets a double dose of protection: a code framework that is widely accepted and based on sound engineering. Undated codes replace both dated code sections and dated standards references. Just as the model building codes are developed by considering the views of all stakeholders, the embedded standards that are the technical underpinnings of the code are developed using a similar consensus process drawing on a wide universe of knowledgeable and committed scientists and engineers.[iv] It is no accident the participatory democratic processes resulting in model codes and technical standards improve not only the lives of those who use buildings, but the nation as a whole.

II. Introduction

Our interconnected and technologically advanced global society presents us with more challenges, opportunities and information every day. We are looking for ways to cope as individuals, as communities and as a country. The quest to secure and provide necessities, such shelter and the desire for good jobs and satisfying lives, is compounded by greatly increased access to information and a rapidly shifting mix of products and technologies. Perhaps some of the technology we have created has gotten somewhat "ahead of ourselves" in terms of our ability to keep up with, and properly assess, what is available. At the same time, we welcome new knowledge and new capabilities to improve our lives and to prevent and respond to threats to our safety and security, health, finances and to the planet that sustains us. In such complicated and stressful times, it is useful to pause and thoughtfully consider the tools and resources that can guide our way. Building codes are among these essential tools. Residential and commercial building codes provide a comprehensive set of minimum health, safety and energy standards for the design, construction and maintenance of new houses and buildings, and major renovations. They set an understandable and reliable floor for construction practices that reduce our vulnerability to a wide range of hazards.

After the planning and design process, the first step to building a new home, school, hospital or other structure, or doing a major renovation or addition to an existing building, is a getting a permit from the local building department. The permit requires the structure's design and construction to adhere to state and local laws, many of which are based largely on national model codes. Model codes are developed in an open, transparent, democratic, national process that welcomes input and participation from all interested stakeholders. While most states or localities have adopted some model code version, not all have adopted the most current version, which results in a patchwork of codes.[v] Some jurisdictions do not make it a priority to enforce codes, or don't have the resources to do so. If all

communities used and enforced the most current model codes, building professionals, consumers and public officials could expect consistency across state lines and multiple code jurisdictions, even when states adapt the model code to suit local conditions, such as climate and historic or cultural preferences.

To a large extent, state and local building codes and standards and their level of enforcement reflect expectations for safety, health and well-being…..protection from natural and man-made hazards, safe and cost-effective construction, conservation of natural resources and low energy bills, and the model codes they are based on are the result of many different views coming together and achieving consensus about what is essential and what is not. Merriam-Webster Dictionary defines "consensus" as a "general agreement" or "the judgment arrived at by most of those concerned". The wide participation in model code development ensures both deep and broad expertise is involved and the inclusion only of provisions with broad support.

When model codes are enforced by a particular jurisdiction, they serve as a common-language script for architects, engineers, builders/contractors and inspectors. They provide consistent specifications and requirements for product manufacturers and suppliers. State and local governments that adopt and enforce model codes when they are updated every three years help assure the most current knowledge is a fundamental part of new buildings in their jurisdictions. Current codes, and the process to develop model codes, also stimulate the market for product innovation and improved building performance. They are an important driver for U.S. economic development and competitiveness. For building owners, occupants, investors, insurance providers, elected officials and citizens, enforced, updated codes establish a baseline for acceptable and cost-effective quality and performance. Conversely, when state and local authorities do not adopt and enforce current codes, they are allowing construction of buildings that do not meet the current consensus on minimum public health and safety. Sadly, most people will never know their buildings are measured against out-of-date codes and standards. They erroneously assume their jurisdiction's permits and inspections ensure the buildings they use every day meet the current consensus on fire safety, structural integrity and other aspects.

Despite uneven adoption and enforcement, our process for developing model building codes and standards in the United States is a true expression of the federalist system our founding fathers envisioned. It is a national framework for state implementation. While it may not be perfect (i.e., regular improvement is necessary), the model code process is imbued with broad expertise, current technologies, materials and practices. The availability of model codes permits local elected officials to make technologically sound decisions as they weigh the needs of their communities.

Think of the process as a continuing conversation, spanning decades, among all experts involved in the built environment. Every three years, the code development process brings forward the newest challenges, the best ideas, the most reasonable solutions and the most practical vision for state and local jurisdictions using model codes. Each new model code is refined to reflect a new consensus of our changing priorities, technology advancements, improved construction practices and marks a new chapter in a great and shared heritage of evolving and shaping a better future.

III. Background

In the United States, building codes usually refer to model codes, which, as noted, are developed in a national forum, taking the views of all interested parties – as well as state and local codes -- into consideration. Codes are designed to protect buildings and the people and property inside them from fire, earthquakes, windstorms and other extreme events. They also ensure structural integrity; electrical, plumbing and mechanical system safety, as well as accessibility and practical and achievable levels of energy efficiency.

Building codes underpin the work of architects, engineers, builders and developers. Architects and engineers must ensure their building designs meet or exceed the minimum, legally-mandated code requirement for a particular jurisdiction. The local building department reviews plans submitted to them before construction and issues permits before the project can proceed. Inspectors verify the project, as constructed, complies with the code. Building industry stakeholders affected by building codes include contractors and subcontractors, manufacturers of building products and materials, insurance companies, facility managers, building owners and tenants, and building inspectors.

The strength of a jurisdiction's building code affects the competitiveness of builders and building suppliers alike. Code changes enable innovation in the building sector and permit more innovative products and processes to gain market share. As new building requirements are reviewed through the model code revision process every three years, innovative stakeholders make their cases for inclusion. These innovations add value to buildings and improve their impact on health and safety. To the extent an innovation leads to enhanced construction industry job skills, it increases those workers' market value as well.

A. The Model Codes

I-Codes (International Codes): The International Code Council (ICC) was founded in 1994 by the three regionally-based model code organizations: the Building Officials and Code Administrators International (BOCA), the International Conference of Building Officials (ICBO) and the Southern Building Code Congress International, Inc. (SBCCI). The purpose was to streamline the building regulatory system through a single family of codes offering consistency and compatibility to multiple layers of requirements existing at the federal, state and local level. The final consolidation of ICC occurred in 2003, culminating in one organization with a combined history offering more than a century of experience in developing model construction codes.[vi] The ICC's updated editions every three years comprise a set of 15 integrated, topical, geographically specific model codes, including the International Building Code (IBC), the International Residential Code (IRC) and the International Existing Building Code (IEBC).[vii] The 2012 edition of the I-Codes contains provisions consistent with the minimum flood-resistant design and construction requirements for buildings and structures of the National Flood Insurance Program (NFIP).[viii]

ICC also publishes the International Green Construction Code (IgCC), developed in partnership with the American Institute of Architects, ASTM, ASHRAE, USGBC and IES. The IgCC offers a streamlined

administrative process that is coordinated with other commonly adopted I-Codes and provides a baseline for regulating sustainable construction.

NFPA Codes: Prompted by concerns about electrical and fire safety in the late 1800s, the National Fire Protection Association (NFPA) was the first to develop model codes. NFPA develops, publishes and disseminates more than 300 consensus codes and standards designed to help prevent and minimize the effects of fire and other hazards.[ix]

B. Brief History of Building Codes

"Over the centuries, building codes have evolved from regulations stemming from tragic experiences to standards designed to prevent them."- The Insurance Institute for Business & Home Safety (IBHS)[x]

The Code of Hammurabi (1800 B.C) is generally recognized as the world's first building code, although this code was essentially a criminal statute that included capital punishment for shoddy workmanship that resulted in death. The great fires of history including Rome (64 AD), Boston (1631), London (1866), Chicago (1871), Baltimore (1904) and Cleveland Clinic (1929), led to soul-searching and new regulations.[xi]

The beginning of modern codes can be traced to the 1897 publication of the NFPA's National Electrical Code® (NEC®). (Today, the 2014 NFPA 70®: NEC® covers the latest requirements on electrical wiring and equipment installation issues, including provisions for the use of connections, voltage markings, conductors and cables).[xii] Early attempts to prevent fires -- predecessors of today's zoning laws and safety codes -- included requirements for wider streets, limitations on building spacing and height, and elimination of thatched roofs and wooden chimneys in cities. Sanitation concerns were the moving force behind some early codes and over the years, have led to plumbing standards, light and ventilation requirements, minimum room dimensions and other health and safety requirements we take for granted in today's building codes. Tragic fires at the MGM Grand in 1980 and the Station Nightclub in 2003 led to more recent requirements for fire protection, including sprinkler systems, exit lighting and limits on explosives and pyrotechnics.[xiii] [xiv]

Natural disasters also lead to code improvements. Hurricane Andrew in 1992 resulted in the development of more stringent construction standards. The storm that destroyed South Florida revealed a serious deficiency and led to Florida's first statewide code system. Seismic code provisions appeared first in Italy and Japan in the early 20th Century and in the United States as an appendix to the Uniform Building Code in 1927.[xv] Research programs have increased our understanding of earthquakes over the years, and serious research programs beginning in the 1970s led to code upgrades following the Northridge Earthquake in California in 1994. Specific provisions within the IBC, IRC and IEBC are intended to ensure structures can adequately resist seismic forces during earthquakes. These seismic provisions represent the best available guidance on how structures should be designed and constructed to limit seismic risk. FEMA officials, however, say some jurisdictions have been slow to adopt the latest code editions with seismic safety provisions. They warn new structures in these communities will "probably not provide the current minimum level of protection from earthquake hazards." FEMA also is

concerned states and local jurisdictions with "high levels of seismic hazard" that have adopted model codes have weakened or excluded seismic provisions.[xvi]

C. The Advent of Energy Efficiency Codes

The 1970's oil embargo and concerns about energy security and conservation of natural resources have since spurred the development of energy efficiency provisions in building codes. But new construction has continued, and the U.S. building sector currently consumes about 40 percent of U.S. energy -- more than either the transportation or industrial sectors. As most of this energy comes from fossil fuel combustion, the building sector is a major contributor to U.S. greenhouse gas emissions. There is now scientific evidence that these and other greenhouse gases are contributing to higher global temperatures and a growing concern about the effects of climate change, such as rising sea levels and more erratic weather. Energy codes help reduce greenhouse gas emissions and other pollutants from buildings that affect our health and ecosystems. Energy efficiency simply means that our buildings can do more with less energy. This reduces the need for fossil fuel-generated power. Attained through energy code adoption, enforcement and compliance, energy efficiency is the easiest, quickest and cheapest way to reduce our dependence on fossil energy and sustain our environment. It also saves us money. In 2011, the U.S. residential sector spent about $229 billion ($2,125 per household) on energy bills, while the commercial sector spent another estimated $183 billion.[xvii] Buildings constructed under the 2012 code reduce energy usage by more than a third compared with the 2006 code.

D. Code Development and Implementation: Democracy in Action

1. How Model Codes Are Developed; Who Participates

Unlike the top-down, government-driven standards development process practiced in many parts of the world, American codes and standards are developed from the grassroots up, with fairness, openness, inclusiveness, transparency, balance of interest and due process.[xviii] This model code development process is structured to result in consensus on both public health and safety issues, and on achieving economic value. Codes are developed taking into account established scientific and engineering principles, and the experience of leading technical experts, construction professionals, enforcement personnel and the product manufacturers.[xix] ICC, for instance, draws heavily on the expertise of its more than 50,000 members, mostly local code officials, builders, designers, manufacturers, labor and industry representatives. However, anyone can participate in the model code revision process at no cost; consumer interests and preferences are well represented. Meetings are held with proper notice. Documents are publicly available. Anyone can propose changes or testify. All views are heard and considered before voting.[xx]

The building codes and standards are greatly strengthened through this exacting process of reaching informed decisions only after considering each suggestion and criticism from all stakeholders., This process may take a little longer than the more autocratic alternatives, but it protects the integrity of the code development process and results in codes and standards that are the envy of the world for their accuracy, completeness and adherence to public health and safety.

Suggested Call Out:

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2. How Building Codes Become Law

Because our federalist system of government reserves property law for state and local authorities, thousands of state and local jurisdictions have the right to adopt their own sets of codes. In the past, this led to a complex mixture of local practices that often were inconsistent and contradictory, and sometimes led to tragedies such as the Baltimore Fire of 1904. In that tragedy, much of the city burned because of the lack of interoperability in fire equipment from different jurisdictions responding to the fire. Now, these standardization problems do not happen because state and local codes can reference consensus standards and provide a common base. They are almost all adaptations of the various model codes.

Model codes are transformed into local law when they are enacted by state legislatures or local governments, thereby becoming local building codes.[xxi] These local building codes then become the rulebooks for the jurisdiction's construction industry and the primary mechanism for states and municipalities to assure its new buildings are up-to-date. Statewide building codes have advantages over local codes. They provide uniform requirements across the entire state for new construction. The absence of statewide codes leads to conflicting requirements and different levels of quality in construction in neighboring political jurisdictions. When designers, builders and suppliers can rely on one set of codes for planning, designing, purchasing and construction, they can enjoy economies of scale. When uniform construction standards are robust and current, they contribute to the resiliency of buildings and help maintain quality of life and property values, and make it easier for appraisers, lenders and buyers to assign appropriate values to the properties. The insurance industry supports current statewide codes because codes help make homes and buildings less vulnerable to the effects of severe weather events. This leads to fewer claims, a healthier industry and less need for public or private disaster relief.[xxii]

Since the builder, rather than the initial homeowner, usually makes the decisions during construction that affect a home's quality, codes provide building owners and users confidence the building is constructed with health, safety and basic comfort in mind; that it will be safe in a storm or earthquake; and that fire safety, mechanical properties, and energy and water use were all carefully considered.

3. How Building Codes Are Enforced

Once adopted, jurisdictions typically provide a window of time to phase in and implement newly adopted codes. This allows for education and training for the building industry workforce and for building inspectors. While many in the building industry work hard to conform to code requirements, building inspections guarantee for buyers and lenders the public health and safety goals of code

adoption were achieved. This requires skilled and trained plan reviewers and building inspectors who know what to look for. If these functions are not adequately funded and staffed, building code enforcement is likely to be spotty at best. Therefore, it is important for code officials and inspectors to be given the proper training opportunities which enable them to remain current as soon as possible on code updates. Although these training resources are primarily provided at the state and local level, it is in the national interest to support federal legislation that enhances the capabilities of code officials and inspectors through suitable training to ensure new construction meets or exceeds these minimum levels.

IV. Codes as Living Documents

A. Importance of Three-Year Updates

Some code opponents are pushing for a six-year code cycle. Six years is, in effect, a full economic generation in the building industry and too long to wait to update the code book if the American building industry aims to be a leader in innovation. It does not make sense for building codes to ignore half a generation of new products and knowledge of better construction practices.

Code updates spur innovation that creates better products and stimulates economic development. State and local building codes need to keep up with continuing advancements in building science and technology. By the end of the three-year code cycle, many new products have emerged that were not contemplated by the previous model codes. After six years, parts of building codes are getting significantly out of date, especially when high-tech features such as IT-integrated ("smart") homes are involved. After six years, jurisdictions seeking to update their codes must navigate the complexities and expense of two cycles of changes in each model code instead of one.

Not surprisingly, companies with higher percentages of new products tend to have higher average profit margins. The corporate performance metric, "percentage of sales revenue derived from new products three years old or less," has been trending upward for many high-performing companies. Sales revenues for high tech companies such as Apple are generally around 60 percent from new products, while the average company's new product sales revenues now approach 30 percent.[xxiii] Building sector suppliers also are trending in a similar direction, with companies such as Legrand North America now at 50 percent sales revenues from new products.[xxiv]

Up-to-date building codes can lead to valuable operational cost-savings for building owners. The Department of Energy estimates that in all climate zones, costs associated with the energy efficiency improvements required in the 2009 and 2012 codes have paybacks between one and two years.[xxv] This means builders, performing at the 2006 code level, are forcing their buyers to pay 50 percent more to heat, light and cool their homes than would be the case if they had used the 2012 code. The $2,000 or $3,000 extra in initial costs the builder experiences pales in significance compared to the tens of thousands in reduced energy costs the building owners or residents will experience over the building's useful life.

Suggested call out:

"This means that builders, performing at the 2006 code level, are forcing their buyers to pay 50 percent more to heat, light, and cool their homes than would be the case if they had used the 2012 code. The $2000 or $3000 extra in initial costs the builder experiences pales in significance when compared to the tens of thousands in reduced energy costs the building owners or residents will experience over the building's useful life."

Failure to update codes condemns purchasers of buildings constructed during the "out-of-date" code period to the consequences of that failure during their buildings' lifetimes. Buildings remain for a long time at the quality level of their original construction. A house built today is likely to have the same orientation, foundation and building enclosure for its entire useful life. Its roofing system, wiring, windows, and energy and water efficiency are, to varying degrees, upgradeable, but only at significantly greater cost than as part of original construction. Since a building constructed to the 2012 code is going to be a more advanced and more valuable building than one built to the 2006 or 2009 code, it is a shame for owners of today's new buildings to miss out for years on these benefits because their municipalities' codes fell behind.

The hospital industry is one of the most highly regulated of all public services, yet they call for codes to be updated regularly. In a letter published in the 2013 Edition of the American Society for Healthcare Engineering Advocacy Report, Rich Umbdenstock, President of the American Hospital Association, wrote: "Hospitals across the country are striving for excellence and are improving patient care based on state-of-the-art science and best practices from the field. In the codes and standards that regulate the health care physical environment, we should also strive for excellence and to reflect the latest scientific developments. The codes and standards that regulate hospitals help keep our patients, staff and visitors safe. But it's important to keep these requirements updated, so they reflect the changing health care environment and incorporate the latest science. Outdated, obsolete codes can pose problems for hospitals, often causing resources to be needlessly diverted away from patient care for requirements that have been changed in newer editions of the code. By the adopting the latest codes and standards, authorities regulating hospitals can ensure a safe environment without unnecessarily diminishing scarce health care resources."[xxvi]

B. Why States and Localities Should Adopt Current Model Codes.

For consumers, updated codes can mean a lifetime of cost reductions. Meeting consumer demand is also necessary for the economic health of the building sector. Model codes represent a national consensus on the minimum standard of new building performance. Code changes are a major signal of changing consumer preferences. Failure to upgrade to avoid a small percentage increase in construction costs serves no one's long term interest and helps keep the sector in the doldrums. This is especially counterproductive when the improvements required by the revised codes pay for themselves quickly and, in the case of energy and water efficiency, improvements lead to appreciably lower lifetime costs for the building owner. It is equally counterproductive regarding the homeowner's financial interest to delay the implementation of lessons learned from major storms like hurricanes Katrina and Andrew.

According to U.S. Senate testimony by Michael Merwach, Senior Vice President and Chief Underwriter of USAA, Congress should act to create financial incentives for states to adopt and enforce statewide model building codes to prevent losses from natural disasters, save lives and reduce the need for taxpayer-funded disaster aid.

In a presentation by Mississippi's Insurance Department, Commissioner Mike Chaney spoke about the value of building to current codes not only to save lives, but also to protect our property investments and save the federal and state governments a lot of money in mitigation costs. Commissioner Chaney cited for comparison purposes two earthquakes in 2010: The earthquake that hit Haiti in 2010 killed an estimated 230,000 people, injured 300,000 and left approximately 1 million homeless, and collapsed or damaged 250,000 residences and 30,000 commercial buildings. In comparison, the earthquake that hit Chile the same year was an 8.8 magnitude earthquake, much stronger than the 7.0 magnitude earthquake that hit Haiti, yet the death toll in Chile was 521 compared to the 230,000 in Haiti. "The undisputed answer is the adoption and use of modern building codes. … The path forward to community resilience is the adoption of modern model codes within three years (not six) of new versions with no allowance for negative amendments." The essential elements for strong, safe and sustainable communities include: strong, well-enforced codes and standards; consumers who understand and demand stronger, safer buildings; higher education that includes building codes and mitigation; as well as insurance and real estate tax incentives and building and social science research.

Updated codes also facilitate U.S. building suppliers' competitiveness. Supplying the construction industry is becoming an increasingly international activity. If the codes are not improved regularly, there is less incentive for American building component manufacturers to innovate and be competitive. The United States cannot afford to allow American building suppliers to fall further behind their international competitors, especially when the industry is finally coming out of a deep recession. Some European codes have been on the cutting edge of innovation and efficiency for a decade and a half, which in turn has kept leading European suppliers to the global building industry at the top of their game.

Out-of-date building codes hurt the international competitiveness of U.S. construction industry suppliers. The more dated the local building code becomes, the less incentive local builders have to innovate, and the more inefficient and behind the times the building industry and its domestic suppliers become. Updated codes, in contrast, can stimulate the market for new housing by encouraging a more desirable product. The more technologically advanced standards in Europe have paired up with new technologies and improved overall building techniques, some of which are superior to what is available today in the United States. It is only a matter of time until these European code-inspired products increase their penetration the U.S. market and displace domestically made goods.

C. Why Jurisdictions Should Enforce Codes

Code enforcement can improve public health and safety. Adoption and enforcement of the most up-to-date codes reflect a jurisdiction's increased knowledge and commitment to ensuring the health and safety of its citizens. If environmental lessons learned from increasingly severe storms or advances in

geological science are addressed in the new code but not the old one, then failure to make consensus improvements in new buildings may have safety consequences that raise red flags for insurers.

Failure to adopt and enforce current codes puts a jurisdiction at a competitive disadvantage. Codes are not arbitrary regulation. Codes uphold a democratically derived, minimum level of quality and of public health and safety that a new building should not fall below. Not staying current is a decision that state and local lawmakers have the right to make, but the decision has its consequences for consumers, business growth, investments, jobs and taxpayers. The failure to adopt the current code signals a jurisdiction is willing to accept sub-quality lifestyles compared to most of the rest of the Nation. It also signals to companies considering a move that this jurisdiction tolerates mediocrity and decline does not place a premium on being current and competitive, and that its workforce may not have current, competent skills as well.

V. What Lawmakers Should Consider

A. Cost and Benefits of Codes

Studies have consistently shown the benefits of up-to-date building codes outweigh the increase in construction costs.

Current Safety Codes for Greater Resiliency -- In a 2012 Congressional briefing, insurance executives said the increasing cost of extreme weather events challenges the industry's ability to help clients manage risk, and that extreme weather events are increasing the number of businesses and homes considered uninsurable in the private market.[xxvii] In many cases, this leaves government – and, therefore, American taxpayers – liable for the costs and the risks as the "insurer of last recourse." According to the Insurance Information Institute, the total hurricane-related risk insured by the government has increased 15-fold since 1990 to $885 billion. Incorporating measures that make buildings and infrastructure more resilient will make communities less vulnerable and provide long-term savings for taxpayers, households and insurers.

A building or home that meets the most current code will withstand the forces of nature better than homes built to older codes. Storm and earthquake damage is extremely expensive and, to a large extent, avoidable through cost-effective enhancements at the time of construction and careful construction practices. A study done for the Insurance Institute for Business & Home Safety (IBHS) found that losses from Hurricane Andrew, which caused more than $20 billion in insured damage, would have been reduced by 50 percent for residential properties and by 40 percent for commercial properties if they were built in accordance with Florida's 2004 statewide building code.[xxviii]

Another IBHS study following Hurricane Charley in 2004 found that conformance to current building codes reduced the severity of losses by 42 percent and loss frequency by 60 percent.[xxix] A 2005 study funded by FEMA and conducted by the National Institute of Building Sciences' Multihazard Mitigation Council found that every dollar spent on mitigation would save four dollars in losses. A task force led by the Institute for Market Transformation (IMT) found that every dollar spent on code compliance and

enforcement efforts returns six in energy savings, an impressive 600 percent return on investment.[xxx] This makes the insurance industry a major advocate for stronger codes. They realize the increasing intensity and frequency of weather events caused by our changing climate is a threat to their business model if structures of all kinds are not built more resiliently. From the homeowner's point of view, increased resilience increases the chances of a home being insurable at a reasonable price.

We have learned the hard way it is much more expensive to rebuild homes than to build them right in the first place. Researchers at Louisiana State University found that if stronger building codes had been in place, wind damages from Hurricane Katrina would have been reduced by a whopping by 80 percent.[xxxi] A 2012 Milliman study found the Safe Building Code Incentive Act of 2011 (H.R. 2069) would have saved the federal government an average of nearly $500 million a year in hurricane relief payments if it had been enacted in 1988.[xxxii]

The 2012 President's Hurricane Sandy Rebuilding Task Force was charged with the development of guidelines and recommendations of how to direct more than $20 billion in federal funding for infrastructure recovery and resilience. One of the recommendations is for states to use the most current building codes saying that "using the most current code ensures that buildings and other structures incorporate the latest science, advances in technology and lessons learned . . . These codes help ensure that more resilient structures are built and that communities are better protected from all types of hazards and disasters . . . "

Current Energy Codes for Lower Energy Bills and Improved Comfort -- Energy efficient construction enables building users to control the temperature and humidity of the indoor environment rather than letting the weather outside dictate indoor comfort. Installing sufficient insulation and sealing leaks are two basic strategies to minimize heat loss or heat gain. But they are routinely overlooked by builders, either intentionally to save time and money, or because builders are unfamiliar with these practices. Energy codes and code enforcement address both. Energy efficient construction helps ensure comfort and cost savings. A study of the incremental construction costs and the energy savings of single-family homes in Illinois built to the 2012 International Energy Conservation Code (IECC) by the Building Codes Assistance Project (BCAP), and ICF International found that new home buyers will pocket between $9,780 and $11,100 in net energy savings over the mortgage term.[xxxiii] With electricity costs projected to increase at or above the cost of inflation, the benefits of these improvements increase over time. Energy efficiency does not always cost more.

Better, smarter design and construction can cut first costs as well as operating costs. The BCAP/ICF study also found the 2012 IECC presents opportunities to reduce the size and cost of HVAC equipment as a result of a tighter building envelope. For example, for a "typical" house in Climate Zone 4, builders are able to reduce the cooling system capacity from 61,500 kBtuh to 49,500 kBtuh, or from 5.125 to 4.125 tons. This reduction in air conditioner capacity can result in first-cost savings of one ton, which is expected to save approximately $815 for each new house. Taking into account both incremental costs and savings, this study estimates net incremental costs for Climate Zone 4 will range from $958 to $1,775, depending on which wall construction type builders select.[xxxiv]

Environmental Benefits -- Of course, the related reduction of greenhouse gas emissions brings substantial societal benefits, which makes these improvements even more beneficial. Mayors, insurance executives, building professionals and consumers have joined the chorus supporting low-energy buildings that reduce carbon emissions. The U.S. building sector's disproportionate consumption of energy makes energy codes a relatively low-cost, high-return way to reduce the U.S. carbon footprint.

The many challenges to public health and safety and environmental sustainability in our increasingly complex global society call for a holistic approach to public policy development and business models, including how we construct buildings. Thoughtful consideration of "performance goals" prior to taking action is important for budget planning and for establishing priorities, such as: public health and safety; protection of ecosystems and the important functions they serve; accessibility and mobility for all citizens; affordable housing; and economic sustainability. Implementation of new policies and practices should start by identifying the intersections and synergies that will achieve the performance goals (which may change) in the most responsible and cost-effective way possible.

B. Consumer Feedback

Lawmakers who survey their constituents are likely to find little support for outdated building and fire safety codes. In 2012, the Consumers Union released the results of a survey done jointly with the Building Codes Assistance Project (BCAP). The survey summarized the responses of more than 5,000 adults, evenly split by gender, two-thirds of whom owned homes. The responses made it clear an overwhelming percentage of those surveyed placed a high value on strong building codes. The key results follow: Eighty-two percent of homeowners felt they have a right to a home that meets minimum energy efficiency standards. Seventy-four percent felt codes add to the purchase price of a new home and effectively lower monthly operating costs. Seventy-five percent felt energy codes should be enforced like other safety and quality standards of construction. Seventy-nine percent would rather pay slightly more for a new home and have affordable, predictable operating costs and energy bills.[xxxv] These findings are consistent with the move toward quality in-home purchases and the increasing popularity of homes with energy efficient and green features, as well as and the speed with which consumers produce electronics and other products with improved features.

C. Life Cycle Cost (Purchase Price + Operating Costs)

Europeans have been constructing new buildings that outperform the U.S. levels for several years.[xxxvi] In a relatively short time period, builders in Europe were glad to incorporate the green building features (which the United States is only now adding to the codes) because they result in a highly sought after premium product commanding a higher price. Builders and buyers are in a win-win situation in those countries. Buyers appreciate lower energy and water bills, lower maintenance costs, less mechanical noise and higher quality of life. They willingly pay high enough prices for these buildings to make them profitable for Swiss builders. Non-MINERGIE homes are now harder to sell in Switzerland than those built to the near net zero energy MINERGIE standards. It is expected that similar market realignment toward quality will occur in the United States once buyers understand the advantages of the premium

performance of buildings built at or above the 2012 code. Once meeting the 2012 code becomes standard business practice, it is expected the costs of meeting those requirements also will come down.

First Costs. To builders, the most important number related to new homes is the total initial cost of the building (first cost). Since a builder's objective is to sell the building at a profit in the short term, his/her emphasis is on minimizing first costs to maximize profits. If improvements such as increased energy efficiency will reduce owner costs over time, but also slightly increase the sales price, not every builder will want to change voluntarily. Visible cosmetic upgrades that may help stimulate the consumer to a quick sale, such as marble countertops, are popular offerings by builders even though they may increase the overall cost of the home. But invisible energy and water efficiency improvements are less popular with builders because they lack the immediate visual gratification of a luxurious countertop. Smart homeowners should look at the building as a long-term investment and focus on the quality of life the building provides.

Operating Costs. The most important costs to the owner usually are the current operating costs of the building (principal, interest, taxes, insurance, utilities, average repairs and maintenance, and home owner association fees) and to a lesser extent, the costs during the period of his/her ownership. Thus, consensus improvements in the 2009 and 2012 codes that improve public health and safety and reduce building operating costs are a plus for the homeowner and also for most others in the code development process, but do not necessarily match the short-term financial interests of the builder.

These increased cost items end up in the code because societal benefits and other interests beyond those of the homeowner were considered in that process, as well as those of construction suppliers, not simply the first costs. Take with a grain of salt claims that these increased costs do not benefit anyone. If they didn't, they would not be in the code at the end of a democratic process where everyone has a say. Indeed, a February 2013 National Association of Homebuilders survey of what home buyers want found that "nine out of ten buyers would rather buy a home with energy-efficient features and permanently lower utility bills than one without those features that costs 2% to 3% less.[xxxvii]

"So what do home buyers really want? The first answer is energy efficiency. Four of the top most wanted features involve saving energy…"

There are also structural problems in the U.S. appraisal and financing industries, which, if resolved, can help builders get their desired price for the green and innovative improvements.[xxxviii] For historical reasons, there are low caps on the extent an appraisal can vary from recent sales prices of buildings of comparable size, location, age and quality. Therefore, when a building with substantial energy improvements is compared to an inefficient building, only a fraction of its energy upgrade costs may be added to the appraised value. There are efforts under way to soften these rules so, it is hoped, energy efficiency will be more popular with builders in the future. It is important to remember that when a new code is adopted, all builders have to raise their performance, which leads to more buildings with energy efficiency levels comparable to the 2012 requirements. When comparables are available that meet the 2012 code, the value of 2012 levels of energy efficiency will move to the initial estimated value rather than having to be added in as an improvement to the comparable buildings.

D. Higher Stakes -- Greater Frequency and Intensity of Storms, Terrorism Threats and Rising Energy Costs Increase Need for Preparedness, Preventive Measures and Resiliency

Stimulation of Building Sector Recovery. Up-to-date codes can increase demand for new buildings and accelerate building sector recovery. Code enhancements represent the consensus of building improvements desired by interested parties, including consumers. This guidance is important market intelligence and provides domestic manufacturers and suppliers with insight into important consumer demands. It may also provide the incentive to invest in innovation and offer improved products. Public exposure to groundbreaking products in the new construction market can lead to increased awareness by homeowners and other building owners of how buildings can be improved. It can also lead to the increased upgrading of the existing building stock.

Alternatively, if the code is not updated, innovation becomes a voluntary decision of the builder or homeowner. New products that cost a little more than the alternative tend not to be used, even when they would give the buyer years of increased value, comfort and operational cost savings.

Elimination of Cross-Jurisdiction Confusion. When a jurisdiction adopts a model building code, it adopts a specific edition; for example, the 2012 International Residential Code, which then becomes law in that jurisdiction. Updating is not automatic. When a new edition of a model code is released, that jurisdiction may choose to ignore it and continue using the older version. When a jurisdiction does not use the latest model code or modifies it significantly, it can create confusion for builders, architects and engineers working across jurisdictional boundaries.

The older versions of the code are law until they are replaced, meaning their out-of-date provisions and the out-of-date versions of imbedded standards must be followed. This is especially difficult for builders who work in more than one jurisdiction and must follow different codebooks and different standards for different jobs.

Increased Costs from Insurance Losses. After coming to the realization in the 20th century that substandard buildings and poor workmanship added to their losses, insurance companies were a major moving force behind comprehensive building codes. From an insurance company perspective, the billions spent in the United States each year for repair/reconstruction of buildings as a result of various natural disasters is unnecessarily inflated by out-of-date codes. These codes allow too many homes and other buildings to be built below the level of quality that can withstand predictable levels of storms in a region. Although not a perfect solution for all conditions, the industry sees updated building codes as providing a level of protection from wind, seismic activity, fire and other hazards acceptable to a wide segment of society. Codes that facilitate buildings' use of renewable energy also enhance a community's resiliency by enabling critical operations to function when severe storms lead to power outages. For example, the 2014 edition of the NEC has been revised to include new approaches for ensuring safety of photovoltaic (PV) electric systems.[xxxix]

VI. Challenges and Opportunities

A major barrier to the adoption and enforcement of building codes is the belief that government should not have a role in regulating private-sector development. Many of the individuals and groups who are actively opposing state adoption of current safety and energy codes present a variety of reasons why building codes are misguided when, in fact, they are articulating a personal philosophical belief that they just don't want the government to tell them how to run their business. This view contrasts sharply with the expectation of most citizens that their government should at least protect public health and safety. Political philosophies are generally indifferent to opposing philosophies.

A. Political Philosophies on Government Regulation: Regulatory Burden

A newer point of view lumps codes and standards with stereotypical "government regulations," which reportedly place weighty burdens on business. In this view, traditional code benefits are not discounted completely, but the initial construction costs, including the costs to builders complying with codes, are given more weight. Even though proponents of this philosophy participate throughout the code development process and receive many concessions there, this argument has a decidedly "Us versus Them" flavor in the political arena, where arguments switch toward advocacy and away from consensus and the common good. It is important in these debates to remember that code changes are a consensus opinion carefully developed over time. Legislators should be careful not to overturn a consensus position after hearing only one side because that ignores the fact that most of the other segments of the building community disagree with the parties trying legislatively to overturn the consensus.

This said, contractors do have some legitimate concerns about code implementation.[xl] Contractors are correct that code compliance must be simple to be a good value to their customers. Compliance documents also must be published in clear language that all stakeholders understand. They are also correct that appropriate training needs to be available, both for industry professionals and for government inspectors.[xli] It makes sense to have model procedures as well as model codes, and for state and local code officials to think through how best to implement codes in specific local jurisdictions. However, these implementation concerns are separate from the question of whether to adopt code revisions, and they should not be used as an excuse to push for code process back to three years into the future.

B. Keeping up with improving technology and looking ahead to meeting changing public health and safety and resiliency needs. A building is built to last for many years.

There has never been a greater emphasis on building science and technology than there is today. Advances in building materials occur every year. Appliances are just beginning to be designed to communicate with buildings, with each other and with building users. Buildings are achieving new levels of quality, safety and energy efficiency.[xlii] The costs associated with implementing innovations are decreasing. A three-year code update is crucial to take advantage of these innovations so they are cost-effective.

Code modifications help accelerate innovation, because they create markets for products at and beyond the current code. Innovation can improve quality of life for the consumer and increase sales and profits for the builder and building supplier. Even when model code modifications do not apply to existing homes, they increase awareness of what is possible. They also lead to economies of scale and lower prices as companies compete with products that meet the new code requirements. This, in turn, leads to increased levels of retrofits in existing houses.

C. Ensuring Resources for Local Code Authorities (Financial and Technical)

Unfortunately, budget cuts in many jurisdictions have resulted in staff layoffs or hiring freezes, fewer inspectors in the field and less training on code provisions. According to the National Institute of Building Sciences, "Jurisdictions lack the resources to properly enforce building codes. At the state and local level, where code adoption and enforcement is largely conducted, the lack of resources, both financial and technical, significantly affects the ability of state and local officials to ensure that new buildings are satisfying the requirements provided by codes and standards and achieving the inherent benefits."[xliii] In the cases of the 2009 and 2012 energy codes, adequate funding of code enforcement is necessary to guarantee consumers the energy savings these codes are designed to provide. Failure to properly fund inspections also can intensify the damage from national disasters. Independent studies of damage following Hurricane Andrew and the Northridge Earthquake revealed lax code enforcement needlessly increased total damage.[xliv]

At the same time, a growing number of mayors, who are on the front lines improving community resiliency and sustainability, recognize that building energy efficiency is an essential part of the solution. At their 2013 annual meeting, the U.S. Conference of Mayors adopted a resolution stating "the 2015 IECC will strongly influence efficiency performance in millions of U.S. homes expected to be built in the U.S. over their 70-80 year lives." The resolution "opposes the adoption of proposals that backslide from the 2012 IECC's stringency".[xlv]

D. Workforce Training: Best Practices to Meet/Exceed Mandatory Codes Cost-Competitively. Examples of Enhanced Builder Profitability

Construction of energy efficient and resilient homes mandated by current and future codes requires improvement in construction workforce skills. For example, properly constructed building envelopes require much greater precision and attention to detail, because problems such as thermal bridging and inadequate insulation often cannot be corrected after the fact. There are first-time costs involved in attaining new skills. The first time a home builder builds to a new standard, it is a learning experience and costs go down in subsequent buildings as the workforce becomes more efficient and adjusts to the higher expectations. Leading builders have shown that over time, their investment in new skills and training in best practices pays dividends with new business opportunities.

E. Educating Consumers about the Value of Codes and Getting Them Involved in Code Adoption Hearings

Consumers have much to gain from the adoption of current codes. Their homes are more resilient and better able to withstand extreme weather. They are likely to have reduced energy costs each year they own their homes. Energy efficient homes are also quieter, less drafty, healthier and overall likely to contribute to a better quality of home life. Since these enhancements pay for themselves quickly and lead to lower monthly home ownership costs, regular code updates are in the best interest of consumers. Most new home buyers do not have the expertise to inspect their purchase to ensure it was designed and constructed to meet minimum codes for fire safety, structural integrity energy efficiency or resistance to damaging winds. Trading lower operating and repair costs for slightly lower purchase prices is a losing proposition for them each and every year they own the home. Building codes are homeowners' only assurance that their health, safety and general welfare have been considered as their homes are built or renovated. Home lending institutions also come out winners with current and competent codes. Their clients have a more secure financial future with long-term reduced costs of heating cooling operating and maintaining homes. And when a homeowner decides to sell a code-compliant or beyond-code house, appraisals should be able to assign a value for those features. Consumers need to be educated on the value of codes and to have opportunities for their interests to be represented effectively in code adoption hearings. Just as auto safety improved when people understood the consequences of inferior products and demanded better cars, homeowners need to learn what improvements to the quality of home construction make financial and policy sense, and can be delivered through current building codes.[xlvi]

F. Demonstrating the Business Case for Three-Year Code Updates

Codes and standards developers often proactively reach out to interested parties to make sure all points of view are fairly heard before the document is finalized. This is not only the right thing to do; it is the prudent thing to do.

Code modifications help accelerate innovation because they create markets for products at and above the current code. Innovation usually improves our quality of life and can increase sales and profits for builders and suppliers. Code updates also lead to economies of scale and lower prices as companies compete with products that meet the new code requirements. This, in turn, leads to increased levels of retrofits to existing houses.

G. Why the Insurance Industry Participates in the Building Code Process

Property insurers were among the "inventors" of modern building codes – and have played an active role in the codes process for more than 100 years. They have worked to expand codes to cover fire-related risks and natural hazard-related provisions as well. Today, the increasing cost of extreme weather events has added to the challenge of managing risks related to natural hazards. Not surprisingly, extreme weather events are increasing the number of businesses and homes that cannot quality for private insurance. In many cases, these high-risk properties end up being insured by a state-

backed government insurance program, leaving taxpayers liable for the costs and the risks as the "insurer of last recourse." Insurers understand the importance of current building codes and participate in the code development process individually or through their membership in the Insurance Institute for Building & Home Safety (IBHS).

VII. Complementary Policies – How Policy Changes on Related Issues Could Revolutionize the Building Sector by Making Code Compliance and High Performance Building Profitable for All Parties

We close by encouraging the codes community to think about its history and where it wants to be in the future. Codes have a storied past and have done a lot of good for mankind. A time traveler from several hundred years ago would be shocked that codes have contributed to ending the Black Plague, that the fires that repeatedly devastated cities are no longer on people's minds and that an unbelievable level of comfort, at least from a 15th century perspective, not only is possible, but required by law.

If that traveler moves forward in time 20 or 30 years, it is our hope codes will have led to further dramatic improvements that have helped solve today's carbon emission-related problems and have taken quality of life to a new level. These changes would have occurred much more rapidly if we had known in earlier times what we know in 2013 about how to achieve quality, safety and resource efficiency in building construction. Now is the time to start thinking holistically about how codes and standards can be used to implement that knowledge for the benefit of all of us and our planet. A building is only built once, and the consequences of new construction decisions last for its lifetime. They affect not only energy, environment, resilience and safety, but also the other design objectives of the Whole Building Design Guide (www.wbdg.org), including cost effectiveness, functionality, accessibility, productivity and overall sustainability. The code development process is a place where knowledge rules and where all affected parties get together to reach consensus on how to make better buildings.

There are an increasing number of builders who go beyond code to enhance energy efficiency, incorporate renewable energy technologies, and achieve resilient and sustainable sites and buildings. These builders are at a disadvantage in explaining these features both to potential customers and to appraisers and lenders. In other countries, voluntary reach codes have been an important way to legitimize these features and to test concepts that have later been added to mandatory codes. A similar approach in this country is worth considering.

A broad look at the financial aspects of achieving high performance is also warranted and deserves the support of the codes and standards community. Current appraisal and lending guidelines contain outdated limits on how much a building's value can vary from comparable buildings in the neighborhood. These arbitrary caps on valuation of energy efficiency, for instance, have closed the secondary mortgage market to highly energy efficient buildings, even though the increased energy efficiency, if designed from the beginning, pays for itself in reduced operating and maintenance costs. Rethinking these requirements and allowing the market to determine what energy improvements are cost-effective would go a long way toward allowing homes, buildings and codes to continue to evolve for everyone's benefit.

There is pending federal legislation that, if enacted, would enable codes to improve our building stock. The Safe Building Code Incentive Act (H.R.1878/ S.905 and H.R. 1878), sponsored by Sen. Robert Menendez, D-New Jersey, and Rep. Mario Diaz-Balart, R-Florida, would amend the Robert T. Stafford Disaster Relief and Emergency Assistance **Act** (Stafford **Act**).[xlvii] The legislation would increase the maximum total of contributions for a major disaster by an amount equal to 4 percent of the estimated aggregate amount of grants to be made under the **Act** if, at the time of a declaration of a major disaster, the affected state certifies that it has in effect and is actively enforcing a state **building code** that: (1) is consistent with the most recent version of a nationally recognized model **building code**, (2) has been adopted by the state within six years of the most recent version of the nationally recognized **code**, and (3) uses the nationally recognized **code** as a minimum standard. The bill is supported by the BuildStrong Coalition, which is promoted by building safety allies, including the insurance industry, national business and consumer organizations, fire service, emergency managers, the Congressional Fire Services Institute, the International Code Council, the National Fire Protection Association and building professionals dedicated to promoting stronger building codes. Jimi Grande, chairman of the BuildStrong Coalition and senior vice president of federal and political affairs for the National Association of Mutual Insurance Companies (NAMIC), said the legislation is intended to encourage governors and state lawmakers throughout the nation to put the power of modern building science to work for homeowners and business owners.[xlviii]

VII. Conclusion

In the introduction, we stated the purpose of this paper is to explain why it is in the best interests of the consumer, the business community and the nation to update model building codes at least every three years; for states and local governments to adopt or adapt the model codes; and for local jurisdictions to enforce the codes. There are compelling reasons to do all three.

Three-Year Codes

The historical purpose of codes, ensuring public health and safety and providing for the general welfare, is an increasingly complex undertaking. Improvements in our knowledge and understanding of earthquakes, windstorms and other natural events happen regularly, as do improvements in our understanding of the causes and effects of increasing temperatures and climate change. Anticipated changes in environmental conditions during the course of the 21st century will impact the buildings we are constructing today. Our model codes need to be updated regularly to reflect that increased knowledge. Some call this “future proofing”.

Three-year intervals match the business cycle. Three years or less is the standard definition of a new product. Innovative companies now have half or more of their sales generated from new products, and the average company has almost 30 percent. This means if the cycle slips to six years, a majority of products sold when the code was written are out of date at time of update, and the most innovative companies, including building industry suppliers, have an almost completely new product line. Six years is just too long to wait.

State Adoption of Code Updates

Model codes adopted statewide and their updates do the heavy lifting for state and local legislatures wishing to have current building regulations. These codes represent the views of all relevant parties and are developed in a rigorous participatory democratic process where all points of view are considered. All stakeholders including builders, building owners and managers, and contractors offer amendments, many of which are successful.

Code Enforcement

Failure to update the skills of building inspectors and plans reviewers partially undermines the value of adopting new model codes. While many builders try hard to meet code, not all do. A systemic plan review and well-trained inspectors can detect unintentional lapses caused by lack of knowledge or mistakes by the designer or builder. Therefore, it is important to have a budget and a plan to keep a jurisdiction's building permitting and inspection at the level of the most recent model code, as well as to maintain trained and qualified staff qualified to read and interpret construction plans and ensure that minimum requirements of the code are met.

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