



**Resilient Southwest Building Code Collaborative**

**DE-FOA-0002813**

**Project Location:** Arizona statewide; best practices shared across Southwest states and jurisdictions.

**Interest Areas Addressed:** State and Local Code Adoption, Workforce Development, Implementation and Compliance, Innovative Approaches, Equity, Energy and Environmental Justice, Partnerships

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**Team Organizations:** International Code Council (ICC); LISC Phoenix; Southwest Energy Efficiency Project (SWEEP); Urban Sustainability Directors' Network (USDN); CUADRO Design; Quest Energy Group

**State and Local Partners:** Arizona Department of Administration; City of Avondale, AZ; City of Flagstaff, AZ; City of Glendale, AZ; City of Mesa, AZ; City of Peoria, AZ; City of Scottsdale, AZ; City of Tempe, AZ; City of Tucson, AZ; Coconino County, AZ; Town of Clarkdale AZ; City of Albuquerque, NM

## Project Description

Climate challenges for the southwestern United States are sufficiently unique that existing national guidance has limited utility. For example, much of the guidance around net zero energy buildings is based on heating being the largest energy demand. In Arizona, however, the major population centers are subject to extensive and extreme heat, making the largest source of energy demand cooling. Arizona produces virtually none of the fossil fuels it consumes and the relative isolation of the principal demand centers from sources of imports also mean that the demand and stresses on the Arizona grid differ from those in other regions. As a result, Arizona communities need to develop a regionally appropriate version of national model codes to effectively address these energy and water efficiency and climate resilience challenges.

With a lack of building codes and state-level collaboration, most Arizona communities use the 2018 I-codes, but many others use even older versions or make the codes optional. This results in Arizona falling in the worst energy efficiency category in analysis of energy code adoption across U.S. The proposed project will develop a pathway for communities in the southwest to transition building construction to net zero energy while emphasizing affordability, energy equity, climate resilience, and innovation by supporting cities are ready to adopt the 2024 ICC model codes, including the IECC; providing a pathway for cities with stronger commitments to transition to net zero energy and resilience based codes; and providing resources and training to help other communities adopt more advanced codes sooner than they would have otherwise. This is an opportunity for project partners to use their leadership to inspire, support, and incentivize action by others in a home rule state with historic absence of coordinated or statewide guidance.

### Technical Description and Impacts

This project proposal represents a partnership between a growing number of Arizona communities, the population of which currently totals more than a quarter of the state's population. Communities in New Mexico will also be participating in the project as our shared climate risks also make the project outputs highly relevant to them. According to the PNNL analysis for the 2021 IECC and 90.1-2019, a quarter of the state's impact would be an energy cost savings of \$787,925,000 and CO<sub>2</sub>e reduction of 7,780,000 metric tons over 30 years, with an added 15,248 jobs. The project will ultimately work to expand its impact to cover the full state of Arizona, and neighboring states and jurisdictions, to move beyond the 2021 estimated impacts to provide greater benefit to the residents and business owners across the southwest. The project has five main objectives, underlain by guiding principles that the process and outcomes are holistic, scalable, equitable, and innovative:

**Expanded equitable public engagement** to reflect input of those who design, construct, and use buildings, and especially those whose health, safety, and financial state are most impacted by the quality of the buildings they use. An equity advisory panel will be established to provide guidance throughout the project and ensure underrepresented voices are adequately heard and respected. Under the leadership of LISC Phoenix, community partners will work with grassroots community groups to promote influence on and acceptance of updated building energy codes, address barriers and challenges to engagement, and understand where more efficient building

energy codes can make the biggest impact in housing and businesses expenses. Recognizing that lived experience is just as important as professional staff participation, participants will be provided stipends for their involvement and their contributions will be validated through transparent, clear, and culturally relevant communication.

**Amend model codes to better reflect the climate realities of the southwest** focusing on climate resilience, energy equity, and housing affordability. Considerations including energy use intensity, thermal comfort, and passive survivability will factor into code development. The code will be supplemented by appendices such as an Extreme Heat Appendix that will seek to maximize resilience to urban heat island and climate change-driven extreme heat events, and a Greening Existing Buildings Appendix will more carefully tailor elements of the IgCC that are critical in the southwest to existing buildings and build on existing grant-funded efforts to bolster energy security in disadvantaged and energy burdened neighborhoods.

**Develop a tiered code adoption roadmap** that steps up to net zero using the custom southwestern amendments as the basis. The project team will engage an innovation advisory panel assembled from design, engineering, research, and local government experts to aid in establishing the basis for the roadmap. Technical assistance from PNNL will be requested to model the building measures that can get to net zero in an optimal fashion while considering not just energy savings and GHG reductions, but also energy burden, the initial cost of construction, thermal comfort, passive survivability, water efficiency, and the most appropriate application of innovative technologies for the region. The document will be reviewed with stakeholders to ensure it builds on and continues to address concerns raised in the public engagement process.

**Develop a living implementation guide** including best practices, tools, education, and other resources to help communities undertake adoption and implementation of advanced building codes. The guide will cover processes related to adoption, equitable engagement, and code compliance and implementation. Resources may include cost assessments, illustrated guides, draft job descriptions for energy and green code review and inspection staff, lists of certified third-party companies, and a draft RFP for third-party energy reviewer services. As jurisdictions adopt the model code their experience will be used to refine the guide. A major partner on this portion of the project, The City of Scottsdale, is working to identify how to improve their review and enforcement capabilities and, based on that experience, guide development of resources and training to support other jurisdictions.

**Develop an enhanced energy, equity, and climate resilience education curriculum** to improve code compliance, expand access to building related job opportunities for marginalized communities, and build a stronger pipeline of construction and trades workers, particularly among urban youth, tribal youth, and marginalized individuals to address both a rural building and trades resource gap and labor shortages that are contributing to a statewide housing affordability crisis. LISC Phoenix will lead the effort to engage existing workforce development entities, such as community colleges, to address this workforce gap. For example, the project will amplify existing programs and resources at Coconino Community College that were enhanced using now-lapsed ARRA funding that can serve as a model for workforce development in rural communities that face real constraints to adopting newer codes due to a lack of local building-related services such as blower door testing. LISC will also focus on the key role tribal youth can

fill in this type of workforce development. SWEEP will develop educational materials aimed at youth from more urban focused disadvantaged communities, and marginalized individuals, such as the recently incarcerated, to educate them on the opportunities for and advantages of a building industry career. This education will be paired with surveys to identify points of appeal that can be used to develop resources to better support the engagement of these communities.

### **Challenges**

A key risk acknowledged by the local jurisdictional members is that proactive, progressive action by Arizona cities can lead to preemption by the legislature. The Collaborative acknowledges this risk but feels that not moving toward net zero energy buildings will result in significant harm to communities. The recently elected state administration, especially with the announcement of an expanded energy agency, appears to be creating a more supportive atmosphere for this work. There will also be pushback from the building industry on adopting more stringent codes, but the Collaboration was formed on the very notion that collective action creating consistency across each jurisdiction's codes, broadening the voices represented at the table, and placing a clear focus on affordability, will shift the dialogue around this code amendment and adoption process in a way that facilitates more sustainable outcomes. The benefit of a large number of valuable partners is also coupled with the risk of effectively managing their individual contributions to the project. A formal project management structure will be established between the primary partners (NBI, ICC, LISC Phoenix, and the cities of Tucson and Scottsdale) to ensure adequate oversight of each aspect of the project.

### **Impact of EERE Funding**

The collective local action proposed is intended to improve consistency between jurisdictions in their adoption of advanced building codes and reduce the burden of implementation by the building industry. A shared model code and implementation guide, enhanced training opportunities, supported by extensive stakeholder engagement, is expected to make the broad adoption of more energy efficient codes more accessible and feasible across the state. The scope and scale of this project requires external funding to successfully implement as it is beyond the purview and budgets of individual cities, but necessary to achieve the collaboration and broad stakeholder engagement needed for state-wide action without the benefit of state-level involvement in building codes. The funding also supports meaningful engagement, above and beyond a typical building code development and adoption process, by allowing financial support to grassroots community organizations that are essential to minimizing harms to and guide benefits toward disadvantaged communities but are typically asked to provide their input for free. Funding this collective action creates a critical mass that is attracting involvement from communities in other states.

Technical assistance from PNNL will be requested provide cost-effectiveness evaluations of proposed code amendments, providing energy and emissions savings and impacts estimates of improved codes using PNNL developed standardized building prototypes, customizing COMcheck and REScheck software tools, and developing stretch code modules to amend model codes for deeper energy and emissions savings based on work of collaborative.

## Addendum

*New Buildings Institute* is a nonprofit organization pushing for better energy performance in buildings. We work collaboratively with industry market players—governments, utilities, energy efficiency advocates and building professionals—to promote advanced design practices, innovative technologies, public policies and programs. We also develop and offer guidance and tools to support the design and construction of carbon neutral buildings. The Principal Investigator for the proposed project will be Kim Cheslak, bringing experience in leading successful DOE granted projects and work across jurisdiction focused cohorts to completion, along with deep technical and political knowledge of code development and implementation. NBI is a recognized leader in advanced building policies, known for the development of both technical and needed supportive and educational content through collaboration with industry experts and government stakeholders.

The *International Code Council* is the leading global source of model codes and standards and building safety solutions that include product evaluation, accreditation, technology, training, and certification. ICC's codes, standards, and solutions are used to ensure safe, affordable, and sustainable communities and buildings worldwide. ICC brings extensive experience in the development of energy codes and the tools necessary for deployment including education and training, certifications, user guides, checklists, and enforcement best practices. In addition to this specific project, outcomes can be shared widely through ICC chapters across the country, integrate into national-level resources and be made available on its Digital Codes platform, thus amplifying the impact of the project beyond the southwest.

*LISC Phoenix* has an impressive track record of Arizona-based community development work including authentic community engagement and building capacity within local community-based organizations and tribal communities. LISC Phoenix can also leverage the extensive experience of other branches of this national organization. LISC Phoenix brings to the project an ethic and intent to listen closely to community partners to gauge their strength and readiness, create clear lines of communication and a decision-making structure which gives community members the power to determine and own the change they want to see, and collaborate closely with communities to move their voice and preferences to the center of each conversation and decision, all leading to more equitable outcomes.

Arizona's State Energy Program (SEP) is currently housed within the *Arizona Department of Administration (ADOA)*. One of the four key goals of Arizona's SEP Program is to increase energy efficiency to reduce energy costs and consumption for consumers, businesses, and government. ADOA, as the initial state agency partner on this proposal, will provide guidance to help align the project outputs with the state's energy efficiency and security goals and ensure that the range of perspectives in Arizona are represented in those resources. Governor Hobbs recently announced Arizona would be "re-establishing the Governor's Energy Office...as the Governor's Office of Resiliency, which will focus on water, energy, and land use solutions." This office "will help coordinate efforts with the many departments, tribal governments, universities, organizations, and others involved in this effort." Once the Office of Resiliency is in place, the role of state agency lead will shift to that entity.

*The Southwest Energy Efficiency Project (SWEET)* is a public-interest organization promoting greater energy efficiency and clean transportation in Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming. This high-growth region where energy efficiency efforts were lagging and air pollution was a growing concern has seen great strides in the last 20 years, due in large part to the efforts of SWEET. SWEET is a trusted regional partner on energy efficiency, buildings, utilities, state and local government action, and coordination with national and local partners.

*Urban Sustainability Directors Network* brings local government sustainability practitioners together to learn, collaborate, and accelerate the work of local sustainability. By equipping them with the knowledge, resources, and partnerships they need to succeed, USDN helps advance change across the field of practice. The aggregate impact and influence of our collective work makes an equitable, resilient, and sustainable society more attainable. USDN will amplify lessons, best practices, and products through USDN's network of more than 260 local governments using its knowledge base, digital tools, all-network workshops, and annual meeting.

*CUADRO Design* is a Chicano owned, Tucson, AZ - based design firm committed to ethics of sustainability, equity and authenticity. We are committed to building with materials and systems that are sustainable for the desert. We are open to exploring new modes of working in these awakening times. CUADRO Design will bring a focus on traditional and affordable building practices that have been demonstrated to be effective for energy and water efficiency and climate resilience in the southwest.

*Quest Energy Group* is a multidisciplinary consulting engineering firm focused on providing sustainability solutions to the building and utility industry including energy analysis/modeling, energy code compliance, investment grade audits, building commissioning and sustainability consulting. We have experience collaborating with on a range of building types and construction delivery methods including single family, multi-family, industrial/laboratory and large scale multi-phased developments. Quest operates out of Arizona, but regularly performs work across the United States, bringing a mix of local application and national expertise.

*Jurisdiction partners* assembled for this project represent most areas of Arizona, and bridge into New Mexico. Beyond building department staff, team members include staff from a wide range of disciplines including sustainability, climate planning, water and energy conservation, equity, housing, community development, and business development. The jurisdictional partners represent a range of community sizes (from the second largest city in Arizona to a small town of around 4,000 residents), climates (from low desert cities to high desert mountain communities), economic conditions (7.3% to 23.4% poverty), and demographics (less than 20% to more than 67% non-white; median age from just over 25 to nearly 60). Each have commitments to improve the energy and water efficiency of their building stock, mitigate climate change by reducing greenhouse gas emissions, adapt to the unavoidable climate impacts facing the region, advance community equity, and improve the availability of safe and affordable housing. In support of these commitments, these partners have formed a collaborative to drive significant action for increased sustainability in the region and have the necessary political and practical experience to advance solutions from the collaborative at the local level to prove viability.