Passive Conservation: Codifying the Use of Water Efficient Technologies

Tampa Bay Water
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I. Project Overview

This paper investigates how water efficiency professionals can utilize the code adoption process to implement increased water efficiency technologies. Beyond the United States Energy Policy Act, a variety of standards are used to codify water use efficiency in states. Conservation professionals assessing how to increase water use efficiency can be integrated into the code adoption process, but few know where or how to become involved. In Florida, the International Plumbing Code is used and updated frequently through a consensus based process described in this paper. Conservation professionals may provide input by either becoming a member of a technical advisory committee or through public testimony. Standards development and code adoption processes are sometimes overlooked by conservation professionals. Through passive conservation, professionals involved with water conservation can improve efficiency through participation in standard and code development processes.

II. General Background

Water use efficiency requirements, standards and codes, in the United States have evolved significantly since the 1970's. The requirements for maximum flow rates and consumption values for plumbing fixtures and fixture fittings (faucets and showerheads) have been included in product standards and referenced in US plumbing codes since the 1970's. Major requirement revisions were made in both product standards and codes during the 1990's due to implementation of the United States Energy Policy Act of 1992 (EPAct). EPAct became effective in January 1994 for residential products and in January 1997 for commercial products. It federally mandated that most plumbing fixtures offered for sale in the United States have a maximum flow rate or flush volume rating. In turn, it required manufacturers to develop new and

more water efficient plumbing fixtures to meet the new mandated requirements for the American market.

Since technology is now available for newer more water efficient products that further improve on EPAct levels, the focus for implementation is to codify these specifications on a state or local level. Because many water supply entities are charged with developing and maintaining adequate water supplies and conserved water is considered one tool to optimize existing supply sources, understanding the link between a standard and code development and implementation is a critical, yet essentially, untapped water resource optimization tool.

III. How and Why Product Standards and Codes Are Developed

Understanding impacts of new product standards on a geographic area is intricately linked to what a standard is, how it is developed, and how it is used. It is important to remember standards are not laws. Standards are first formulated by organizations, such as the American Society of Mechanical Engineers (ASME), Canadian Standards Association International (CSA), International Association of Mechanical Plumbing Officials (IAPMO), International Code Council (ICC), NSF International, and others through deliberate, well defined, consensus based processes. Standards are recommended for acceptance by either following the American National Standards Institute (ANSI) process or other methods of acceptance. Although the majority of organizations follow the (ANSI) guidelines for standards development, others such as ASTM International and CSA do not. After this lengthy process is complete, standards are available for adoption in model codes, state codes, or other regulatory instruments. In regards to plumbing, the two primary model codes used are the International Plumbing Code (IPC), produced by ICC and the Uniform Plumbing Code (UPC), produced by IAPMO.

EPAct legislation was based, in part, on serving the best interest of society. When EPAct was enacted, a federal preemption on state implementation of more stringent standards was created, unless the state first obtained permission from the Department of Energy. This preemption made it difficult for states to establish more stringent standards in the best interest of the public; however it did create consistent requirements throughout the country.

Due to ongoing water resource sustainability issues, water efficiency professionals created new voluntary specifications aiming to spur development and use of products even more water-efficient than those specified in the EPAct. EPA's WaterSense program promotes, certifies, and labels a new set of flow rate and consumption requirements, along with important performance based requirements for water efficient fixtures (see Table 1). The WaterSense program requirements include maximum water consumption levels at least 20% below EPAct, but also include performance specifications to ensure a continued high level of operability. Some water supply and planning agencies have shown interest in the implementation of WaterSense specification into state and local building codes, but this requires the specifications to be written into the appropriate ASME standards.

Table 1

WaterSense Flow Ratings For Fixtures	
Toilets	1.28 gpf[1]
Urinals	0.5 gpf
Showerheads	2.0 gpm[2]
Faucets	2.0 gpm

[1] gallons per flush
[2] gallons per minute

As of 2011, three states, California, Georgia, and Texas have mandated new more water efficient requirements, based on WaterSense specifications, without prior consent of the federal government. This begged the question of whether or not the federal preemption in EPAct was still relevant. It appeared the preemption did not deter states from adopting more stringent water fixture and fixture fitting requirements. When these three states implemented higher water efficiency specifications, the federal preemption ruling was still a factor regarding implementation of new standards or requirements. However, on December 22, 2010 the United States Department of Energy waived the federal preemption for standards related to water conservation of toilets, showers, urinals, and residential faucets. State and local governments are now no longer hindered from adopting more stringent water efficiency standards than those in EPAct for these products. Alternatively, the preemption could technically be reinstated if the ASME standards are revised.

IV. Standards and Codes Integration into Policy

Generally, a standard is first developed by an organization in accordance with a consensus based process. This is intended to minimize special interest group domination of standards development committees. The process set forth by the American National Standards Institute (ANSI) is the most common process employed for development of plumbing product standards by standards development organizations. The American Society of Mechanical Engineers (ASME), ASTM International, American Water Works Association (AWWA), American Society of Sanitary Engineers (ASSE), Canadian Standards Association International (CSA), Cast Iron Soil Pipe Institute (CISPI), International Association of Mechanical and Plumbing Officials (IAPMO), International Code Council (ICC), International Safety Equipment

Association (IESA), National Fire Protection Association (NFPA), National Sanitation Foundation International (NSF), and Underwriters Laboratories (UL) are among the standards development organizations accredited to develop standards for plumbing products and components.

There are three code development organizations that develop model plumbing codes. These codes can be adopted by any state or jurisdiction, based on state or local policy, and can be modified within their discretion. In terms of plumbing codes, the International Association of Mechanical and Plumbing Officials (IAPMO), develops the Uniform Plumbing Code. This version of plumbing code is primarily adopted in the western part of the United States. Another code development organization, the International Code Council (ICC), develops the International Plumbing Code. The ICC is more common in the eastern United States. The last code development organization in this list is the Plumbing Heating and Cooling Contractors Association (PHCC), which develops the National Standards Plumbing Code (NSPC). The NSPC is used in parts of Maryland and the state of New Jersey. Several states and local governments do not adopt a model plumbing code, but choose to develop their own and include the states of Wisconsin, Massachusetts, and Kentucky (See Figure 1 and Table 2).

Plumbing Code Adoption

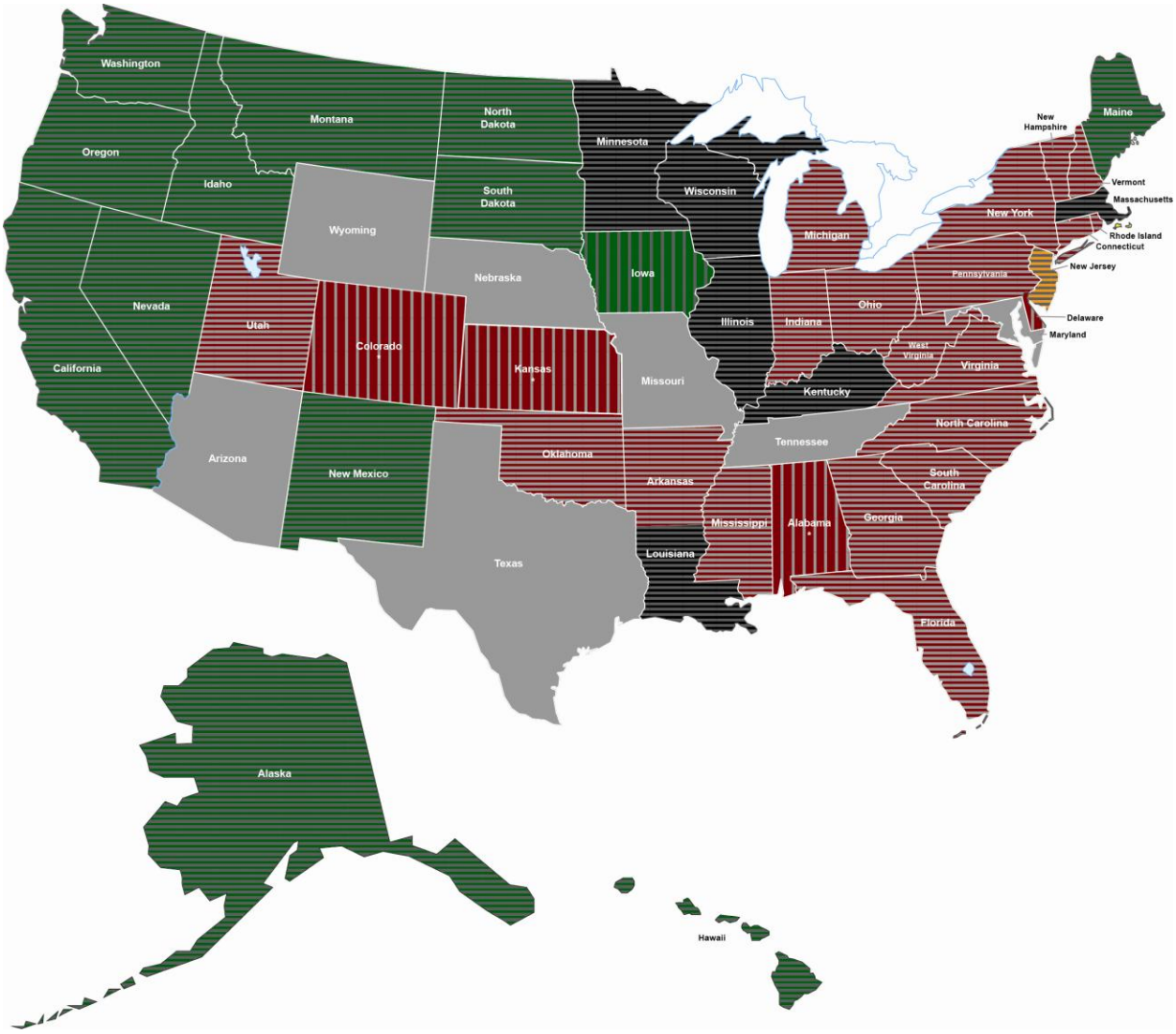

Figure 1: Plumbing Code Adoption

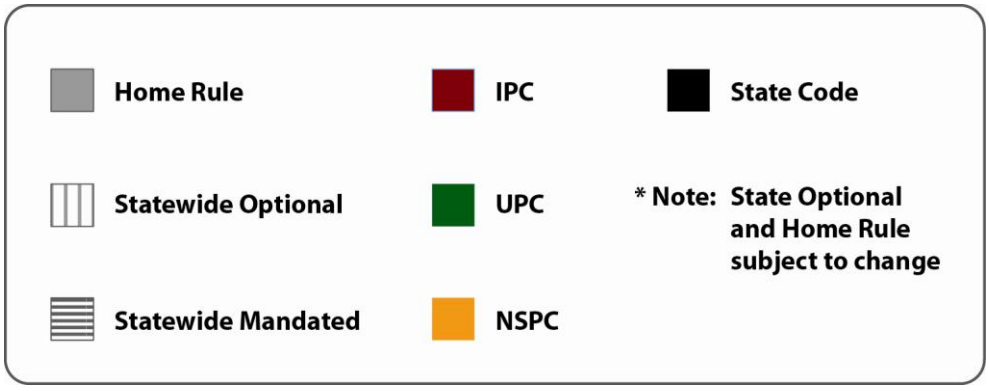

Table 2

Plumbing Codes of the United States		
State:	**Model Plumbing Code:**	**Adoption Process Type (State Mandated, State Optional, Home Rule, etc)**
Alabama	IPC 2009	State Optional
Alaska	UPC 2006	State Mandated
Arizona	Local Adoption	Home Rule
Arkansas	IPC 2006	State Mandated
California	UPC 2006	State Mandated
Colorado	IPC 2006	State Optional
Connecticut	IPC 2003	State Mandated
Delaware	IPC 2009	State Optional
D.C.	IPC 2006	State Mandated
Florida	IPC 2006	State Mandated
Georgia	IPC 2006	State Mandated
Hawaii	UPC 2006	State Mandated
Idaho	UPC 2009	State Mandated
Illinois	Illinois Plumbing Code	State Mandated
Indiana	IPC 2009	State Mandated
Iowa	UPC 2009	State Optional
Kansas	IPC 2006	State Optional
Kentucky	Kentucky State Plumbing Code	State Mandated
Louisiana	Louisiana State Plumbing Code	State Mandated
Maine	UPC 2009	State Mandated
Maryland	NSPC 2006	Home Rule
Massachusetts	Massachusetts State Plumbing Code	State Mandated
Michigan	IPC 2009	State Mandated
Missouri	2009 IPC	Home rule
Minnesota	2009 Minnesota State Building Code	State Mandated
Mississippi	IPC 2006	State Optional
Montana	UPC 2009	State Mandated
Nebraska	Local Adoption	Home Rule
Nevada	UPC 2003	State Mandated
New Hampshire	IPC 2009	State Mandated
New Jersey	NSPC 2009	State Mandated
New Mexico	UPC 2006	State Mandated
New York	IPC 2006	State Mandated
North Carolina	IPC 2006	State Mandated
North Dakota	UPC 2003	State Mandated
Ohio	IPC 2006	State Mandated
Oklahoma	IPC 2009	State Mandated

Table 2: Continued

Oregon	UPC 2009	State Mandated
Pennsylvania	IPC 2009	State Mandated
Rhode Island	IPC 2009	State Mandated
South Carolina	IPC 2006	State Mandated
South Dakota	UPC 2003	State Mandated
Tennessee	IPC 2006	Home Rule
Texas	Local Adoption	Home Rule
Utah	IPC 2009	State Mandated
Vermont	IPC 2009	State Mandated
Virginia	IPC 2009	State Mandated
Washington	UPC 2009	State Mandated
West Virginia	IPC 2009	State Mandated
Wisconsin	Wisconsin Commercial Building Code	State Mandated
Wyoming	Local Adoption	Home Rule

V. Florida Specific Integration Procedures

Model codes and standards are transformed and adopted into building codes through a detailed and deliberate process that can ultimately end in rule modification. Based on an evaluation of available model codes, the state of Florida utilizes the ICC model building, plumbing, mechanical, and fuel/gas codes. The Florida Building Code updating process operates on a 3 year cycle coordinated with the 3 year process ICC uses to update their model codes.

Because Florida adopts the IPC, any changes to the adopted ICC model codes made during the previous 3 years are first evaluated by the Florida Building Commission. The Florida Building Commission, assigned the responsibility to adopt building codes by the legislature, assigns several technical advisory committees (TACs) to review and recommend any proposed modification to the existing Florida Building Code. The TACs include: accessibility, building, administration, building (structural), education, building (fire), electrical, energy, mechanical, plumbing, roofing, and special occupancy. The TAC in charge of reviewing water use technologies is the Plumbing TAC. The intent of these TACs is to provide an informed opinion

and recommendation to the Florida Building Commission, but they do not have any authority in the code adoption process. The TACs will also solicit and review public comments on their recommendations and prepare the comments for use in the rule hearing. TACs are one area where water efficiency professionals' involvement can focus on increased passive conservation through code development.

The Building Commission considers TAC recommendations on proposed amendments at the rule adoption hearing. During the hearing, the public has an opportunity to offer testimony as the proposed changes are discussed and ultimately voted upon by the Florida Building Commission. The public comment section is another opportunity in the code adoption process where water efficiency professionals' involvement can increase passive conservation integration into code modifications.

The adopted Florida Building Code modifications are then filed with the Department of Community Affairs. Modifications are considered final and incorporated into the Florida Building Code, but not considered rule until administrative procedures requirements are followed. By law there will be a minimum of 6 months before new rules become effective. The 6 month period allows manufacturers time to increase production of new products and sell down previous inventory, while allowing rule challenges to occur. Following the 6 month period or rule challenge process, codes are adopted by rule and given an implementation date. If a challenge is filed, there is a delay until it is heard and resolved. In the end the Florida Building Code adoption process takes about 12 months, but could last as long as 18 months (See Figure 2). Another component to this process is the glitch cycle. The glitch cycle is separate from the normal adoption cycle and should only occur in non-adoption years to correct minor

inconsistencies between standards and codes in existing rules. Florida state law allows for the glitch cycle to occur every year between full blown code adoption cycles (3 year cycle).

The building code developmental processes in most states can be characterized as a controlled stakeholder process, with Florida being no different. Any individual, who determines applicable code development will affect them or their business interest, is able to contribute with recommendations. One may contribute by either applying to become a member of a TAC or by submitting recommendations through public comments, reviewed in depth by both TAC and the Commission. To apply to become a member of a TAC, one must exhibit interest by contacting the director of the Building Commission and document that he/she has expertise in the field of the TAC they are applying to. Depending on availability of open seats and the Building Commission discretion, the Building Commission will meet and decide whether or not to accept their informal application.

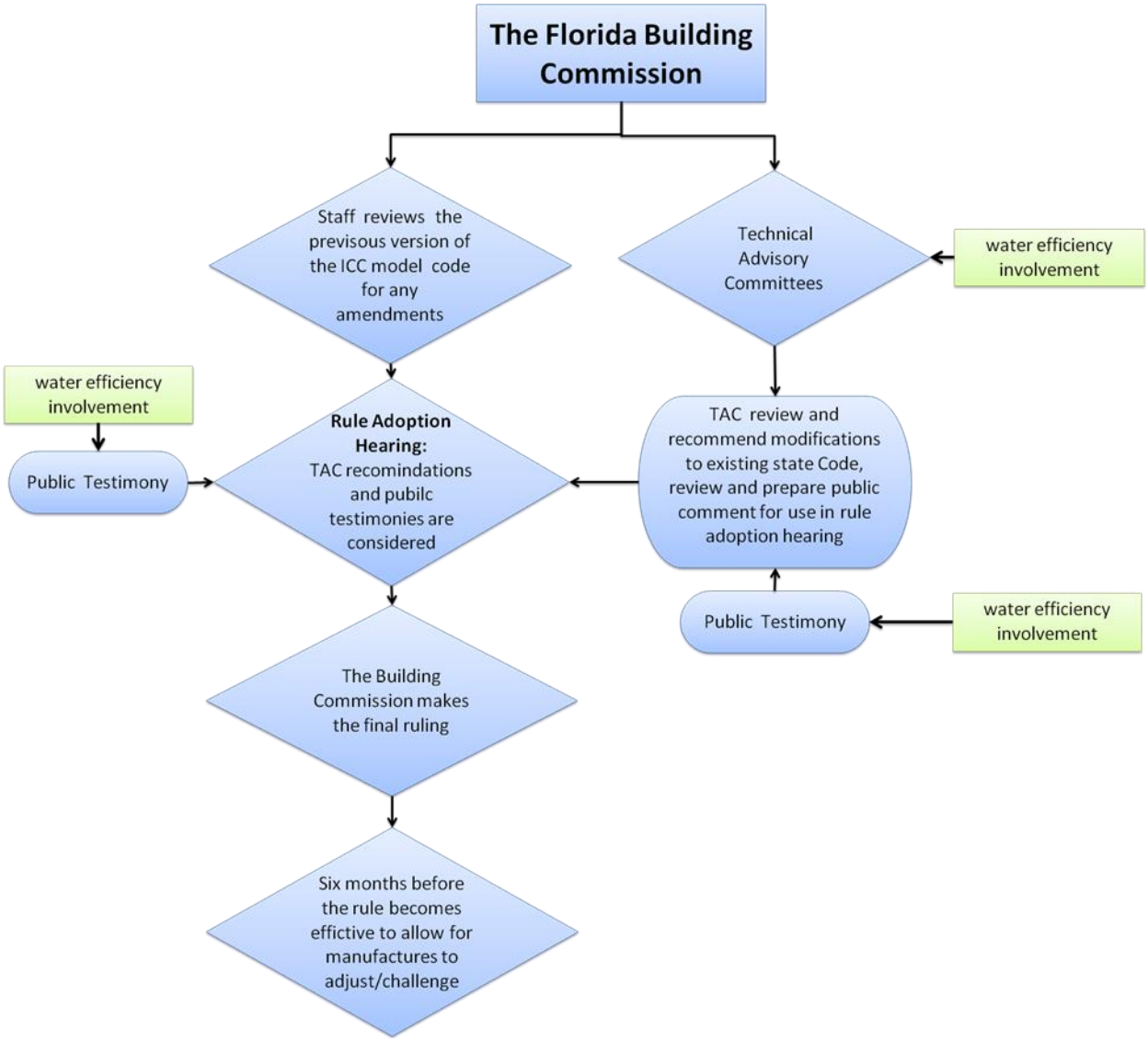

Figure 2: The Florida Building Code Adoption Process

VI. Who is responsible for Building Codes?

When analyzing the disbursement of model building codes in the U.S. it is important to understand who is responsible for the implementation process at the state and local level. For water efficiency professional involvement in the code adoption process, they must find out who is in charge of adopting codes in their jurisdiction. If one is looking for a place to start here are a few questions to research;

- Are the codes in your jurisdiction being implemented statewide?
- If so, are local jurisdictions able to amend the states model code?

There are two general methods states use to advance code implementation, the statewide model code or the home rule code development process. As identified in the previous section, Florida has a statewide mandated model building code not allowing local jurisdictions to adopt less stringent standards than ones specified in the current edition of state building code. However, in some states, including Florida, local jurisdictions may amend the state building code if it does not require less stringent standards then those enforced statewide. Therefore, county and cities may be another location to promote more progressive code modifications, like use of the International Green Construction Code (Florida) or the Green Plumbing and Mechanical Code Supplement.

The second method of code implementation, home rule, allows local municipalities/jurisdiction adoption of building codes. This occurs in Arizona, where the task of code adoption is given to each county. Unfortunately, home rule can create a multitude of contrasting codes following differing standards and/or model codes. If codes and standards do differ, this causes manufacturers to design and specify equipment and product types needing to adhere to different jurisdiction codes rather than being able to manufacture one standard product for sale and use throughout the state.

VII. Integration of Water Efficient Requirements into State Codes through Legislation

The provisions contained in all codes can be superseded through Federal, State or local legislation, such as EPAct, revisions to EPAct, or state laws discussed above, that establish more restrictive water efficiency requirements. For example, in March 2010 Georgia's Governor

Sonny Perdue enacted the Georgia Water Stewardship Act, which among other items required strict specifications in regards to water efficiency. Governor Perdue did this without the consent of the Georgia Building Commission and instead took recommendation from his Water Contingency Task Force. This task force was a collaboration of more than 80 stakeholder groups, comprised of government employees, businesses, and environmental organizations. This collaborative effort proved to be both efficient and intuitive, with the resulting output being created by individuals with different interests. This essentially lessened discontent among formally affected parties. Similar methods may have been at the root of water efficiency changes both in California and Texas.

While this can and has been done, building commissions may be skeptical of legislative intent. In some cases, they may see it as an effort to side-step or disenfranchise the commission. It is important that if a government takes this route, it might lessen chances of a healthy relationship with building commissions on future changes to building codes. Alternatively, commissions may be reticent to increase efficiency in code requirements, even though national code development agencies have created green supplements.

VIII. Codifying Options: Legislation vs. Conventional Building Code Process

Taking a legislative stance on water resource and conservation issues is viable, but there may be a degree of uncertainty associated with output consistency. In the legislative process, there can be an accelerated language development approach versus the conventional building code adoption process, but technical inconsistencies may appear based on author(s) expertise. While the more prescribed/legislative based method is slower than legislation, there is a well-defined deliberative process integrating language development expertise with technical expertise.

In the Georgia case, Governor Perdue incorporated a diverse group of individuals into the policy making process, ensuring quality product development. However, enacted legislation was not based on a set of standards developed through a consensus based approach. Rather, a set of requirements were developed through the task force process.

IX. Conclusion

The methods how government entities adopt water efficiency requirements into code are still widely misunderstood. The code adoption process varies by state, county, and even city. In some cases states may opt to use the home rule method delegating the task of code adoption to the local jurisdiction. In others they will conduct the code adoption process at the state level mandating a state wide building code and in some rare cases use legislation as means to pass water efficiency requirements. What is consistent, however, is the role the code adoption process plays in allowing for water efficiency requirements to become integrated into systems of government. It is evident that water efficiency professionals can and should apply their efforts to pass new and more water efficient requirements in their local jurisdiction. Whether it is lobbying for legislation, contributing to a technical advisory committee, or providing public comment, the path to codifying water efficiency requirements is a path to increased resource sustainability.

References

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