

**Water and Sanitation Standards in Southeast Asia  
Considerations for ASEAN Member States**

**Created by the  
International Association of Plumbing and Mechanical Officials (IAPMO)**

**September 2021**

## Acknowledgements

This report was developed by the International Association of Plumbing and Mechanical Officials (IAPMO). It was developed following research on technical regulations impacting water, sanitation, and plumbing systems in several ASEAN member countries. This research was carried out in collaboration with the International Trade Administration at the U.S. Department of Commerce. For additional information, please contact Mr. Christopher Lindsay at [christopher.lindsay@iapmo.org](mailto:christopher.lindsay@iapmo.org).

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### Disclaimer

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## EXECUTIVE SUMMARY

Worldwide, 2.2 billion people lack access to safe drinking water, and more than half of the global population does not have access to safe sanitation. Access to water and sanitation services is further threatened by growing water stresses. Approximately 2.3 billion people live in water-stressed countries, of which 733 million live in high and critically water-stressed countries. This global water crisis threatens economic growth, national security, and public health.

Water-related challenges in Asia are particularly acute. Home to more than half of the world's population, the region has less freshwater — 3,920 cubic meters per person per year — than any other continent except for Antarctica. Additionally, almost two-thirds of the global population growth is occurring in Asia, where the population is expected to increase by nearly 500 million people within the next 10 years — increasing urban populations by 60%.<sup>1</sup>

These trends impact ASEAN member countries and reduce national capacity to advance domestic priorities, including those related to sustainability, resiliency, and smart cities. Public and private stakeholders domestically and internationally have an important role to play in addressing these challenges, providing technologies and policy solutions that will contribute to a healthier, safer, more water-secure world where people have sustainable supplies of water of sufficient quantity and quality.

As ASEAN member countries continue to make decisions that will shape their water and sanitation systems today and in the future, this guide identifies issues, barriers, and opportunities for policymakers to consider. Central to this report are technical regulations and many of the underlying international standards upon which they are based. Technical regulations are important tools that governments have in helping to shape the construction of quality infrastructure, the availability of safe and efficient products, and the capacity and skill levels of their workforces.

Sustainable water and sanitation services are dependent on a strong local industry to support them. Technical regulations become the common language by which domestic stakeholders (manufacturers, labor, professional organizations, regulators, conformity assessment bodies, etc.) coordinate and communicate internally and with the broader international community.

There are a number of benefits for ASEAN member countries focusing on water and sanitation technical regulations, including that they:

- Contribute to national efforts to ensure water and sanitation access under the UN Sustainable Development Goals
- Represent the quickest and easiest way to respond to growing water stresses impacting the region
- Aid efforts to improve sustainability and environmental quality
- Improve water quality in the near and long term.

Additionally, through collective action on water and sanitation technical regulations, ASEAN member countries can foster trade and support the growth of domestic industries. They can help the region benefit from improved enforceability and avoid technical barriers to trade that arise from locally developed standards, local content requirements, and conformity assessment restrictions. Without

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<sup>1</sup> *Asia's Next Challenge: Securing the Region's Water Future*. Asia Society. April 2009.

coordinated action there is a risk of increased fragmentation among ASEAN markets, increasing the potential costs and technical barriers faced by manufacturers and importers/exporters.

Over the past 20 years, three of the 10 ASEAN member countries have taken important steps to harmonize water and sanitation regulations with each other and with the United States. Indonesia, the Philippines, and Vietnam have each adopted plumbing construction codes of practices based off an industry-developed international standard — the *Uniform Plumbing Code* developed by IAPMO.

These plumbing codes are tailored to local needs and incorporate the latest science, efficiencies and best practices for the design and construction of quality infrastructure. Collectively, these national plumbing codes reference more than 450 individual industry-developed international standards as part of their requirements. More than 200 of these references are shared by two countries or more. They represent a head start in ASEAN’s efforts to harmonize standards and conformity assessment processes.

Water efficiency should be an area for immediate collaboration. ASEAN lags behind other regions around the world in improving water-use efficiency over time. There are opportunities to establish and enforce baseline efficiency levels for plumbing fixtures as well as to expand voluntary labeling and water-efficiency programs in the region to help public and private stakeholders make informed decisions on water conservation.

Water quality is another area of potential collaboration. In building systems, water quality is improved through the availability of water treatment technologies (e.g., point-of-use/point-of-entry filtration systems) and by ensuring the quality of piping and plumbing fittings and fixtures. ASEAN has the opportunity to expand and make mandatory technical regulations currently in place related to these components.

Finally, ASEAN has a unique opportunity to harmonize conformity assessment processes in the region. Many technical regulations in the region around plumbing fixtures and fittings, piping, and water treatment technologies are voluntary. This has contributed to markets in ASEAN member countries frequently being saturated with unsafe and inefficient products primarily due to lack of enforcement regulations and processes related to these products. Lacking formal definition, ASEAN has the opportunity to formalize its markets for water and sanitation technologies, incorporating internationally recognized conformity assessment processes and bodies.

Tremendous progress has been made in aligning market access requirements in the region. Successful initiatives in this area have resulted from partnerships between industry and ministries in ASEAN member economies. Moving forward, continued collaboration between public and private stakeholders will be essential to developing local industries, growing trade, and removing technical barriers.

## **Water and Sanitation Standards in Southeast Asia Considerations for ASEAN Member Countries**

Access to improved drinking water and sanitation is one of the most fundamental issues facing the global community. Approximately 2.5 billion people worldwide do not have access to improved sanitation and 768 million people rely on unimproved drinking-water sources. By 2025, two-thirds of the world's population will be living in severely water-stressed areas. The COVID-19 pandemic and resulting health crisis underscore the fundamental role water and sanitation play in public health and economic development. Response to this virus and future ones is hindered by the fact that approximately 3 billion people do not have access to hand-washing facilities with soap.<sup>2</sup>

The challenges surrounding improving access to water and sanitation services are systemic. Many countries face hurdles related to poor governance, inadequate infrastructure and supply chains, poor system maintenance, skilled worker shortages, and transforming cultural or social norms related to sanitation. These challenges are further compounded by the continuing urbanization and growth of the world's population, which is projected to add 2.5 billion people to the urban population by 2050.

ASEAN countries are not exempt from these global trends. A recent environmental sustainability index that examined 97 different markets showed that ASEAN member countries collectively struggle on equity issues (access to improved water and sanitation) and water efficiency and productivity.<sup>3</sup> Collectively, these hurdles represent an opportunity for the region to focus on environmental technologies and serve to underscore the barriers that must be overcome to ensure quality goods are competitive.

Water is also an opportunity that extends beyond trade and economic growth. It is an entry point to advance core democratic values around equality, transparency, accountability, women's empowerment, and community organization. Water can also be a means of strengthening governance, civil society engagement and resilience at all levels.<sup>4</sup>

This guide is designed to identify important regulatory and enforcement considerations for ASEAN member countries. It can also help national governments create enabling environments that will improve drinking water and sanitation service delivery, enhance water sector coordination, and mobilize investment. This, in turn, will help ASEAN countries meet critical infrastructure and climatic goals in the region while paving the way for increased manufacturing and trade of environmental-related technologies and services for decades to come.

Plumbing codes and related technical regulations are important policy tools for managing the safety, security, health, environment, and economy of this critical aspect of the building sector. They are also regulatory tools for helping economies adapt to water stresses, protect water quality, and improve energy efficiency. Plumbing standards also provide policymakers with an important tool to promote sustainability, encourage economic growth, and develop smart cities.

### **ABOUT IAPMO**

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<sup>2</sup> *Summary Progress Update 2021: SDG 6 — water and sanitation for all*. UN Water. February 2021.

<sup>3</sup> *International's Environmental Sustainability Index*. Euromonitor. June 2019.

<sup>4</sup> *U.S. Government Global Water Strategy: 2022 -2027*. United States Government. November 2022.

The International Association of Plumbing and Mechanical Officials (IAPMO) is a nearly 100-year-old trade association that focuses its comprehensive services on the technical aspects of the plumbing and mechanical industries. The organization is comprised of 13 different business units with offices and staff in 11 countries. Its membership includes trained labor and contractors, engineers, product manufacturers, suppliers, plumbing and mechanical inspectors, and building officials. IAPMO is an international standards developing organization — developing ANSI-accredited standards on plumbing, mechanical, solar construction practices, personnel credentialing requirements and product standards that are used throughout the world. IAPMO is also a premier mechanical and plumbing product testing and certification body, assisting in conformity assessment processes in regions across the globe. It also routinely partners with ministries, professional organizations, and academia to provide technical assistance and assist with skills force development issues. IAPMO also works closely with international aid organizations to create enabling environments for water and sanitation services to spread and local industries to grow in developing nations.

**IAPMO’S APPROACH**

IAPMO has partnered with public and private stakeholders in ASEAN on a multistage strategy across several different countries in the region. The ultimate outcome will be to align water and sanitation technical regulations across the region, creating an enforceable regulatory environment. This will increase the competitiveness of quality products, lower the costs to manufacturers, and facilitate trade. IAPMO’s efforts will also serve to grow the local industry in each country by strengthening local workforces, creating market demand for quality products, improving enforcement, and ensuring the sustainability of these efforts.

The stages of this strategy include:

1. Adoption of a national plumbing code of installation practice (plumbing construction standard)
2. Elevation and expansion of personnel certification and training requirements
3. Adoption of internationally recognized plumbing product standards into technical regulations
4. Formalization of testing and certification requirements, incorporating international conformity assessment processes and bodies
5. Development of local enforcement mechanisms

The benefits of each stage are summarized below

<b>Stage</b>	<b>Benefits</b>
1. Adopt national plumbing construction code	<ul style="list-style-type: none"> <li>• Creates a national plan for development of plumbing infrastructure</li> <li>• References hundreds of internationally recognized product standards</li> <li>• Signals to domestic institutions and international marketplace national regulatory and enforcement intentions</li> </ul>
2. Expand personnel training and credentialing requirements	<ul style="list-style-type: none"> <li>• Builds market demand for quality products as skilled labor better understands the design, installation, and maintenance of systems</li> <li>• Fundamental to infrastructure development, enforcement processes and sustainable growth of market</li> </ul>
3. Adopt technical standards into regulations	<ul style="list-style-type: none"> <li>• Sets mandatory requirements for safety and performance</li> <li>• Creates an enforceable requirement whereby non-complying imported products can be stopped at borders or prevented from sale</li> </ul>
4. Formalize testing and certification requirements	<ul style="list-style-type: none"> <li>• Affirms that products have passed specific performance and quality assurance tests</li> </ul>

	<ul style="list-style-type: none"> <li>Increases competitiveness and market share for safe and efficient products and opens markets to domestic manufacturers</li> <li>Creates a protective market barrier against inferior, noncomplying products trying to enter market</li> </ul>
5. Develop local enforcement mechanisms	<ul style="list-style-type: none"> <li>Ensures that design and construction of buildings incorporate requirements of the national plumbing code and technical regulations for products</li> <li>Represents one of the last and most important opportunities for enforcement and is a culmination of the previous stages</li> </ul>

### **WHY WATER AND SANITATION TECHNICAL REGULATIONS**

ASEAN is Southeast Asia’s primary multilateral organization, representing a combined population of 650 million and combined annual gross domestic product (GDP) of approximately \$2.8 trillion (2019). Collectively, it ranks as the world’s fifth-largest economy. It represents a strategically important region for industry straddling some of the world’s busiest sea lanes. ASEAN is also important because of its focus on economic integration and its work on reducing all barriers to regional trade, creating an important vehicle for collaboration on different sectors.

ASEAN has an opportunity to build on strong commonalities to improve water and sanitation service delivery across the region, establishing a necessary foundation for achieving other national priorities, including:

### WATER AND SANITATION ACCESS

In 2015, United Nations member states adopted an Agenda for Sustainable Development. At its heart were 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries — developed and developing — in a global partnership. SDG 6 is centered on ensuring availability and sustainable management for all. Despite the considerable progress in improving access to safe drinking water and sanitation in the East Asia and Pacific region, around 369 million people in 2019 were still without access to basic sanitation, and more than 52 million people, mostly poor, still practiced open defecation. With regards to access to safe water supplies, 165 million people lack access to basic drinking water services. Access to WASH in schools is a cause for concern, with 12 percent of schools having no drinking water service at all and 32 percent of schools with no sanitation service at all.<sup>5</sup> It also impacts health care facilities, reducing the quality of health care and contributing to high newborn and mothers’ mortality and morbidity rates in several countries in the region.

### IMPROVING WATER QUALITY

Water quality is a universal health concern, as water is a medium for disease transmission in all countries. Pathogenic (disease causing) microorganisms remain one of the most significant threats to water quality in the region. Additionally, water contributes to the distribution of chemical contaminants such as lead and arsenic as well as from contamination from industries and agriculture.<sup>6</sup> Studies in recent years have highlighted the important role that components of water and sanitation play in either preserving water quality or contributing to the introduction of harmful contaminants.

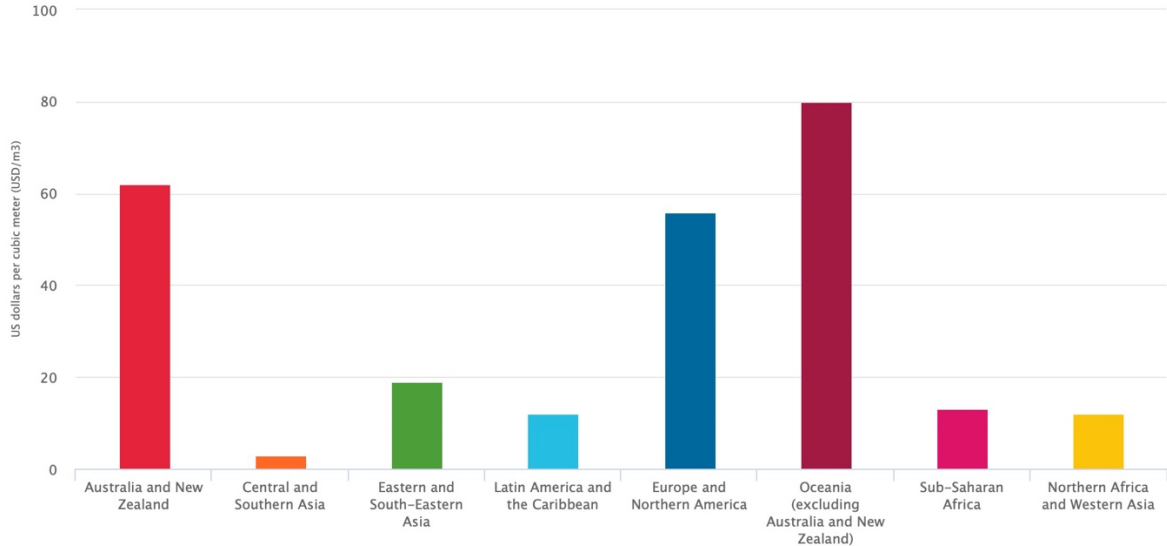
### IMPROVING EFFICIENCY, SUSTAINABILITY AND ENVIRONMENTAL QUALITY

<sup>5</sup> *Water, Sanitation, and Hygiene (WASH) Annual Results Report 2019*, UNICEF, March 2020.

<sup>6</sup> *Drinking Water Quality in the South-East Asia Region*, World Health Organization, 2010.

Sustainability ensures that present needs are met without compromising the ability of future generations to meet their own needs. In 2005, ASEAN published the findings of a questionnaire sent to member countries on water resources management. Among its findings, ASEAN member countries identified water, including water conservation and efficient use, as a key driver to sustainable development.<sup>7</sup> Unfortunately, the sustainability of water resources and environmental quality in ASEAN is threatened by growth in population, increased urbanization, and reduced water availability. Improving the efficient use of drinking water resources will be key to meeting these challenges. According to the U.N., Eastern and South-Eastern Asia report substantially lower changes in water efficiency over time compared to other developed regions in the world.

Status in different SDG regions on Indicator 6.4.1 Change in water-use efficiency over time (2018)



Data source: FAO  
Exported from UN-Water <https://sdg6data.org> on 1 Sep 2021

While individual ASEAN member countries fare better and worse than this regional trend, water efficiency in buildings remains low-hanging fruit for policymakers. Few countries in the region mandate and enforce baseline efficiency levels and fewer still offer voluntary labeling requirements so that public and private stakeholders can better identify products with greater efficiencies.

**BUILDING SMART CITIES**

In 2018, the U.S.-ASEAN Smart Cities Partnership (USASCP) was launched at the U.S.-ASEAN Summit in Singapore. A major focus of this partnership is to share best practices and promote collaboration between public and private stakeholders in improving transportation, water and resource reuse, and health system capacity for cities. Water management is one of the fundamental components that define a smart city in which reusing water in buildings plays a major role. This requires on-site treatment systems, advanced technologies, and skilled personnel to ensure public health and environmental protection.

By focusing on the harmonization and implementation of water and sanitation regulations, ASEAN contributes to the global and national priorities highlighted above. This initiative also:

<sup>7</sup> ASEAN Strategic Plan on Water Resources Management. ASEAN Secretariat. October 2005.



- Creates greater resilience and water security by reducing demand on drinking water even in extreme drought or other water-stressed conditions
- Reduces energy consumption required to heat, treat, and pump drinking water through more efficient plumbing design and reduced water usage.
- Deliver financial savings to consumers by reducing water and energy utility costs.
- Benefits the environment by placing less demand on a vital natural resource and reducing the carbon footprint for buildings.
- Improves housing affordability by reducing costs related to materials, labor, and utility connection fees.
- Protects public health by more efficiently moving water through building pipes, reducing stagnation, and protecting water quality.
- Reduces infrastructure costs by lowering demand on drinking water storage and distribution grids.

## TRADE BENEFITS AND BARRIERS TO TRADE

Harmonization is the process of minimizing redundant or conflicting technical regulations that may have evolved independently in ASEAN member countries. The purpose is to find commonalities, identify critical requirements that need to be retained, and provide a common standard. For the water and sanitation industry, harmonization creates a common technical language used by all stakeholders in the construction sector. It cuts compliance costs and simplifies the process of meeting requirements. It also reduces complexity for those tasked with testing and auditing standards compliance. Harmonization of water and sanitation standards would create a common assessment method for related products and technologies and lay the groundwork for a single ASEAN scheme for declaring product performance. It is one of the most important methods for avoiding non-tariff barriers to trade.

However, international trade for the plumbing industry is not without challenges. The International Trade Administration at the U.S. Department of Commerce identified several key market access issues that persist today as the building products industry in each ASEAN member country seeks to increase exports. The report found that across the building product industry the top export challenges are:

- Tariff impacts that constrain the foreign import market share; and
- *Standards and conformity assessment requirements*, which are the most significant non-tariff barrier to trade. It further found that *compliance cost burdens likely have a disproportionate impact on small- to medium-size exporters*.<sup>8</sup>

Harmonization of standards in the water and sanitation sector is critical to further developing local manufacturing, increasing the competitiveness of quality and safe products, building necessary supply chains, and facilitating international trade.

## INDUSTRY-DEVELOPED INTERNATIONAL STANDARDS

Part of IAPMO's expertise on water and sanitation issues is derived from its role as an international standards developing organization (SDOs). IAPMO's standards are market driven and they benefit from the organization's nearly 100 years' worth of expertise in focusing on water and sanitation issues. Other SDOs developing international standards frequently used in the water and sanitation sector include ASME, ASTM International, NSF International, and the Water Quality Association. These SDOs'

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<sup>8</sup> 2016 Top Markets Report: Building Products and Sustainable Construction, US Department of Commerce, May 2016.

development of standards is demand-driven in that standards are developed in response to specific concerns and needs expressed by industry, government, and consumers.

These standards arise from a formal, coordinated, consensus-based and open process. Their development depends upon data gathering, a vigorous discussion of all viewpoints, and agreement among a diverse range of stakeholders. Thousands of individuals, companies, labor, consumer and industrial organizations, and government agencies at all levels from around the world voluntarily contribute their knowledge, talents, and efforts to these standards-setting activities. Through regular updates, these standards reflect the latest science, best practices, and expertise that industry can offer national regulators on issues around water and sanitation.

These standards are then made available for adoption by national standards bodies and regulating ministries for inclusion in technical regulations and conformity assessment activities.

### **ASEAN ALIGNMENT WATER AND SANITATION STANDARDS — HISTORY**

Over the past 20 years, IAPMO has helped lead one of the most significant efforts to align plumbing construction practices and product standards across the ASEAN region. This initiative was largely focused on assisting the governments of Indonesia, Philippines, and Vietnam to develop their own National Plumbing Code (NPC) based off IAPMO's internationally utilized *Uniform Plumbing Code*. Each plumbing construction code or standard contains the basic requirements for plumbing design and installation. It also references hundreds of internationally recognized plumbing standards used in the sector.

#### INDONESIA

Thanks to a successful partnership between IAPMO and the government of Indonesia, Indonesia adopted its first national standard for plumbing — SNI 8153 Plumbing Systems for Buildings in 2015. IAPMO successfully worked with Indonesia's national standards body (BSN) to provide assistance to the technical committees that were created to develop and review the new standard. Through this effort, IAPMO also opened a new plumbing product testing and certification laboratory in Indonesia — a key industry milestone. Additionally, important partnerships were established with universities and government ministries that oversee the credentialing of a skilled workforce. SNI 8153:2015 has been mandated by the Ministry of Public Works and Housing for the purpose of constructing any new government building. The ministry also encourages the private sector to utilize it.

#### PHILIPPINES

Since 2000, IAPMO has partnered with the Philippine Society of Environmental and Sanitary Engineers, formerly the Philippine Society of Sanitary Engineers (PSENSE). This partnership has culminated in the development of the *Uniform Plumbing Code — Philippines*. It also is the foundation for the *National Plumbing Code — Philippines*, which is an official referral code to the *National Building Code of the Philippines* and is required in the construction of all buildings.

#### VIETNAM

In 1997, IAPMO provided the Institute of Building Science & Technology with financial and technical resources to utilize the *Uniform Plumbing Code* as the foundation for the *Vietnam Plumbing Code*. The project was successfully completed, and the code was officially adopted in 1999 and remains in effect today.

While these national plumbing codes are based on international codes and standards, construction practices in each of these codes have been tailored to suit local needs. The new codes provide the necessary framework for how plumbing systems can effectively be developed and provides local regulators with the ability to enforce these practices. These plumbing codes continue to play an important role in helping to establish a healthy and robust plumbing sector in each country.

**INTERNATIONAL STANDARDS REFERENCED IN NATIONAL PLUMBING CODES**

In 2021, IAPMO examined the references to industry created international standards in SNI 8153:2015 (Indonesia), the *National Plumbing Code of the Philippines* and the *Plumbing Code of Vietnam*. For reference, IAPMO also included standards referenced in the 2021 edition of the *Uniform Plumbing Code*. IAPMO limited its review of referenced standards to those created by ASME, ASTM International, IAPMO, NSF International and the Water Quality Association.

In total, 458 references to international standards were identified across the four NPCs. IAPMO identified 199 references to industry-created international standards in SNI 8153, 135 references in the *National Plumbing Code of the Philippines*, and 213 references in the *Plumbing Code of Vietnam*. By comparison, the 2021 version of the *Uniform Plumbing Code* references 255 similar standards. The data found the following number of standard references were shared across the four countries:

	4 Countries	3 Countries	2 Countries	1 Country
Number of shared references to international standards	38	53	124	244

Collectively, these shared standards provide an ideal opportunity upon which ASEAN can base future work on standards harmonization in this sector.

**RECOMMENDATIONS**

- 1. ASEAN should prioritize water and sanitation regulations in its efforts to harmonize standards.**  
 Water and sanitation systems are critical to meeting national and international goals related to water, sanitation, and hygiene (WASH) access. They are also integral to building the smart cities of the future and for the ability of ASEAN cities to improve water and energy, sustainability, resilience, and environmental quality. This could be achieved either by prioritizing discussions on water and sanitation regulations under existing ASEAN workstreams such as the ASEAN Cooperation on Water Resources Management or by establishing a new WASH-focused working group under the appropriate committee, such as the ASEAN Consultative Committee for Standards and Quality (ACCSQ).
- 2. Use the alignment that exists between national plumbing construction codes as the foundation for future standards harmonization.**  
 Over the past 20 years, three of the 10 ASEAN member countries have taken important steps to harmonize water and sanitation regulations with each other and with the United States. Indonesia, the Philippines, and Vietnam have each adopted plumbing construction code of practices based off an industry-developed international standard — the *Uniform Plumbing Code* developed by IAPMO. Collectively, these national plumbing codes reference more than 450 individual industry-developed international standards as part of their requirements. More than 200 of these references are shared by two countries or more. They represent a head start in ASEAN’s efforts to harmonize standards and conformity assessment processes.

**3. Look to existing industry-developed international standards as safe and efficient options for economies to further their goals toward water efficiency.**

SDOs offer a continuously evolving portfolio of standards addressing plumbing fittings and fixtures, piping and water treatment technologies. These standards are regularly updated to help governments adapt to a growing number of threats to water and sanitation systems. Utilization of these standards as the basis of national technical regulations brings an additional level of expertise and is the most cost effective method of development.

**4. Establish mandatory baseline efficiency and safety requirements for water and sanitation fixtures and technologies.**

Technical regulations governing plumbing fittings and fixtures as well as water treatment technologies are limited across most ASEAN member countries. Few of these technical regulations have been made mandatory. This creates a unique opportunity for ASEAN to harmonize requirements for these products, establishing baseline efficiencies and ensuring continued water quality protection from quality components.

**5. Establish regional water efficient criteria and labeling requirements.**

Water efficiency should be an area for immediate collaboration. Southeast Asia substantially underperforms other advanced economies around the world in improving water-use efficiency over time. Water efficiency also reduces community costs. In addition to establishing and enforcing baseline efficiency levels for plumbing fixtures, there is an opportunity to establish high-performance criteria and to expand voluntary labeling requirements to help public and private stakeholders make informed decisions on water conservation. These criteria should be based on science and consider the entire plumbing system, as water quality and performance can greatly be impacted. The United States' successful *WaterSense* program should be considered as the basis for such an effort. Additionally, ISO 31600 is under development which is to provide a set of best practices and guidance for the preparation and implementation of a water-efficiency labeling program for plumbing products and water-consuming appliances.

**6. Expand policies related to water treatment technologies**

Water quality is another area of potential collaboration. In building systems, water quality is improved through the availability of water treatment technologies (e.g., point-of-use/point-of-entry filtration systems) and by ensuring the quality of piping and plumbing fittings and fixtures. Water treatment technologies can remove or reduce pathogenic microorganisms or chemical contaminants in drinking water at the point of use. However, filtration systems do not all provide the same level of protection. The global market is filled with unsafe products. ASEAN has the opportunity to expand and make mandatory technical regulations currently in place related to these components.

**7. Pursue harmonization of conformity assessment procedures across ASEAN.**

ASEAN has a unique opportunity to harmonize conformity assessment processes in the region. Many of the technical regulations governing plumbing fixtures and fittings, piping, and water treatment technologies are currently voluntary. ASEAN has the opportunity to formalize and differentiate its markets for water and sanitation technologies. With growing markets and the need for these products to meet national goals, there is a tremendous opportunity for domestic and international manufacturers for decades to come. Technical barriers that exist in the region

often are the result of not incorporating internationally recognized conformity assessment processes and bodies into the testing/certification schemes for these products.

**8. Domestic and international private sector stakeholders should be engaged in this effort.**

ASEAN has made tremendous progress in aligning market access requirements in the region. Successful initiatives in the water and sanitation sector have resulted from partnerships between industry and ministries in ASEAN member economies. Moving forward, continued and transparent collaboration between public and private stakeholders will be essential to developing local industries, growing trade, and removing technical barriers.