Asia-Pacific
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The APEC Workshop on Best Practices Sharing of Water-Conservation Standards and Evaluation on Their Benefits

Virtual | 2 – 3 February 2023

APEC Sub-Committee on Standards and Conformance

May 2023

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1. Executive Summary

The APEC Workshop on Best Practices Sharing of Water-Conservation Standards and Evaluation on their Benefits is a project that aims to address the issue of water scarcity in the APEC region. The uneven distribution of water resources, population growth, and climate change have all contributed to the problem of water scarcity, which has significant economic, social, and environmental impacts. The China National Institute of Standardization (CNIS) initiated the project to enhance regional communication and standardization in the field of water conservation.

The project was co-sponsored by Australia; Hong Kong, China; Malaysia and Thailand, and was approved by the APEC Secretariat in February 2022. The project consisted of a Pre-Workshop Survey and a Workshop Meeting to exchange information on water-conservation standards and share evaluation methods and cases for their economic, social, and environmental outcomes at the level of organization and economy.

The Pre-workshop Survey aimed to collect data on APEC economies' water-conservation standards, their implementation, and benefits. It was conducted from June to November 2022. Five experts were involved in designing the survey document, which was disseminated via email. Eleven experts from five economies responded to the survey, and their feedback was used to compile a Summary of the Pre-Workshop Survey, which includes information on water-conservation standards and policies of Australia; China; Chinese Taipei; Thailand and the USA. This summary serves as a fundamental input for the workshop.

The Workshop Meeting was held virtually on 2-3 Feb 2023 and was attended by ten expert speakers and twenty-seven participants from eight economies. The speakers discussed a range of topics, including Water Efficiency Standards, Water Efficiency Labelling Scheme, environmentally friendly sanitary wares and faucets, water reuse, water resources management, practices, water stewardship, and more. The experts also discussed the mutual recognition of test methods, results, and labelling, and how to spread, implement and apply the water management standards.

The participation of female speakers and participants in the workshop was encouraging, with 30% and 48% of the speakers and participants being female, respectively. This demonstrates a commitment to promoting gender equality and inclusivity in the APEC region. Overall, the project was a successful attempt that brought together experts from different economies to exchange knowledge and best practices on water conservation, and it is hoped that the outcomes of the workshop will contribute to more effective and sustainable water management practices in the region.

2. Introduction

2.1 Background

Common challenges regarding water resources in APEC include rising demands for water resources due to population growth, difficulty in balancing agriculture and urban development, and various consequences of changing climate to the region. Northern tropical areas in Australia receive most of the rainfall. At the same time, the significantly drier southern coastal areas hold most of the economy's population, agriculture and industry, leading to seasonal and cross-region variability in water availability, which further complicates the capture, storage and transmission of water resources. Water resources in China are also unevenly distributed due to geographic and seasonal variations in precipitation, which Indonesia and Peru also suffer. Other economies like Japan and the United States also face water-related challenges.

Water-conservation standards are essential measures to save water. Water-conservation standards set guidelines for water usage of water-consuming products and producing processes of various industries. Taking China as an example, there are water-intake quota standards stipulating enterprises' water consumption for production. And China executes water efficiency standards which set market entrance barriers for household water appliances. So a harmonized standard would set an achievable target for economies managing water resources poorly and break barriers of multi-national trade. Public and private institutions might compare water utilization to identify the weak link, which enhances water utilization and cuts costs. Water efficiency standards, clarifying minimum allowable values of water efficiency for household water appliances, would limit domestic water utilization by setting up admittance for water appliances in terms of water efficiency.

Currently, we haven't thoroughly evaluated the implementation benefits of these standards and thus cannot gain sufficient valuable conclusions for further improvement. In the 2010s, ISO developed a method to distinguish the standards' economic effects. Some teams began to research based on ISO methodology, with various other forms, but without consensus in water conservation. A well-demonstrated evaluation might convince private and public institutions to identify

and fill the gap, thus achieving the economic and environmental benefits. A workshop would reveal the experience for the assessment on standards' effects, which suggests a comprehensive yet efficient way.

2.2 Project Objectives

By sharing the water-conservation standards, and their evaluation methods and practical cases, this project expects to arouse widespread concern and discussion on water conservation among APEC economies. Consistent with the consensus of the 2018 APEC Ministerial Meeting and the policy priorities for APEC 2021, this project will promote the circulation of water-efficient appliances and best practices for water conservation in various industries and the regional trade of related products, influence the water conservation work further and profoundly in APEC region, and finally promote incremental sustainability and support green recovery after the COVID-19.

2.3 Project Approach

Once the project has been approved in February 2022, a suitable contractor has been identified. The APEC secretariat signed the Contract with the contractor on March 31, 2022. Subsequently, the project work commenced.

2.3.1 Pre-Workshop Survey (April 2022 — November 2022)

The process of the Pre-Workshop Survey was conducted from April to November 2022 (Figure 1). There are three main stages to this process, developing and designing the survey document, disseminating and retrieving the survey document, and summarizing the responses. The process of developing and designing a survey document took place between April and August 2022. Five experts were engaged in this task, which involved email consultation and meeting discussion. In September and October 2022, the survey document was disseminated around the APEC region. Eleven experts from five economies, Australia; China; Chinese Taipei; Thailand and the USA, provided answers to the survey questions. Finally, in November 2022, the answered documents were summarized, and the Summary of the Pre-Workshop Survey was finished.

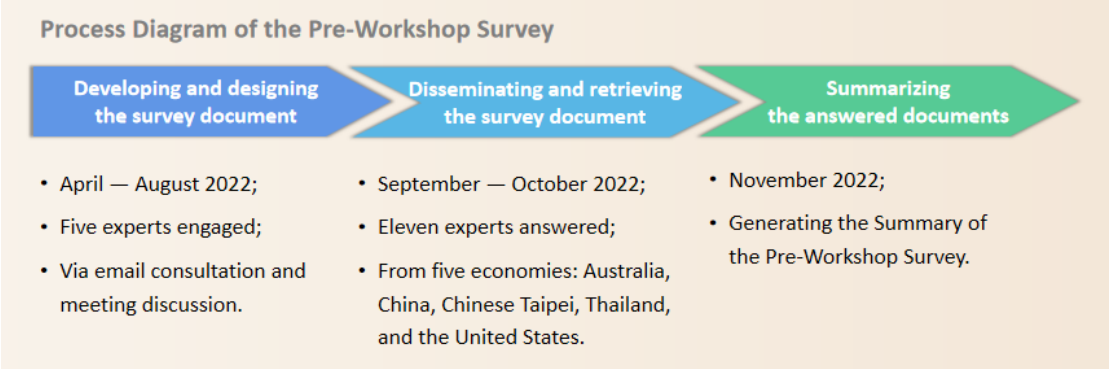

Figure 1. The process of the Pre-Workshop Survey

2.3.2 Workshop (September 2022 — February 2023)

The process of preparing and delivering the workshop involved several stages (Figure 2).

Firstly, from September to October 2022, the agenda and GIC draft were created, and the meeting time and preliminary schedule were determined. From October to November 2022, GIC was circulated among APEC economies and eight economies, Australia; China; Japan; Malaysia; the Philippines; Singapore; Thailand and the USA, nominated speakers or participants, followed by determining the agenda and preparing for the meeting from December 2022 to January 2023, as the workshop was postponed from mid-December to February 2023 due to the COVID-19. Finally, the online workshop took place on February 2-3, 2023, with ten expert speakers and twenty-seven participants attending and nine presentations were given.

Figure 2. The process of Workshop Preparation and Delivery

3. Pre-Workshop Survey

3.1 Survey document

The survey document was developed by the PO and improved according to the industry experts' advice. The survey document collects information on water-conservation standards adopted by the economies, investigates methods and practices to evaluate these standards' economic, environmental and social benefits, and collects cases of environmental change and other benefits for some industries after implementing the standards.

The mentioned water-conservation standards are those aimed at reducing water usage and improving water efficiency, including water management and water-saving standards, except for water quality ones. They could specify limit values or make technological and management suggestions on water appliances and products, manufacturing procedures, service processes, and organizations and regions in agricultural, industrial and residential areas. The standards should be widely adopted in the economy and can be developed at the international, economic, union or other levels.

The complete survey document contains three parts:

- Part 1. contact person information;
- Part 2. water management and conservation standards;
- Part 3. implementation evaluation and cases.

Part 1 consists of several fields that need to be filled out regarding a contact person, including the contact person's name, gender, email address, address, name of the employer, and economy. It provided important information that can be used for subsequent communication and analysis.

Part 2 asks respondents if they have established standards, norms, or programs for water management or conservation for various objects, such as water appliances, enterprises and organizations, regions or watersheds (Figure 3). Additionally, the survey inquires about the aspects that the standards, norm documents or programs specify for different objects, and whether they are applicable to imported products and if they are mandatory or equivalent to compulsory. Finally, the survey asks if international standards, such as ISO

standards, are widely applied in the economy, specifying the name and number of the standards, and whether they are mandatory or not.

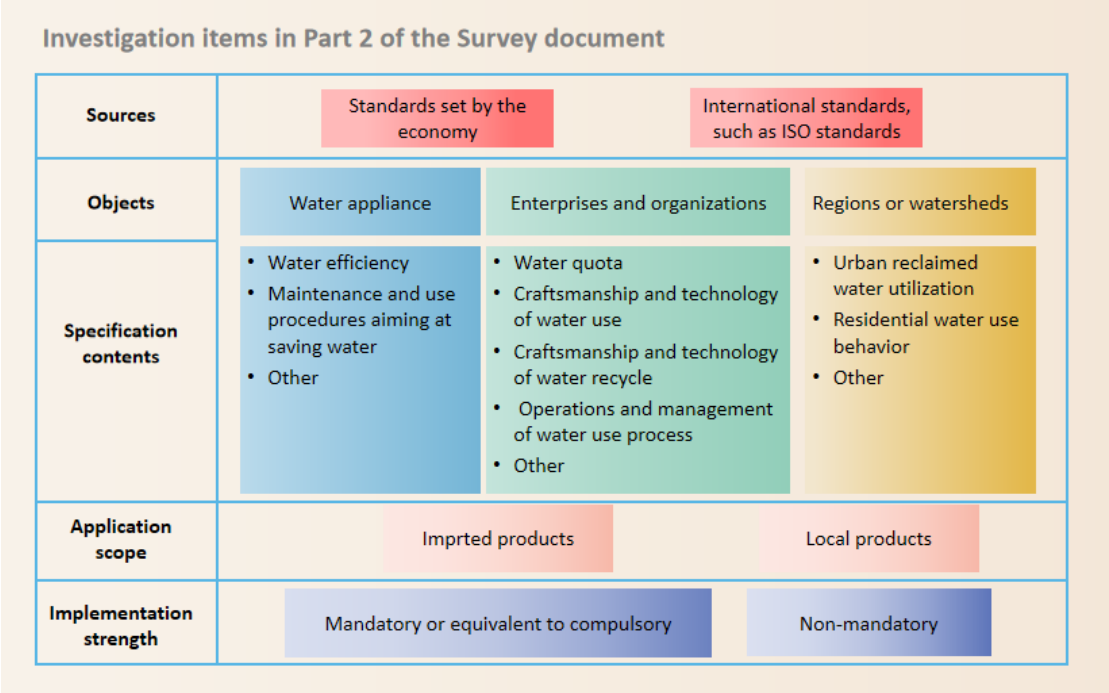

Figure 3. Investigation items in Part 2 of the Survey document.

Part 3 of the survey poses several questions to respondents regarding the implementation, revision, and evaluation of standards, norms, or programs for water management and conservation (Figure 4). Specifically, the survey asks about policies and measures in place to ensure implementation, obstacles encountered during implementation, methods for ensuring timely revision, methods for evaluating the impact of standards, and examples of economic, environmental, and social impacts of specific standards. Additionally, the survey asks whether the standards, norms, and programs meet the needs for water management and conservation in the economy and if there are plans for further work in standardization in this area.

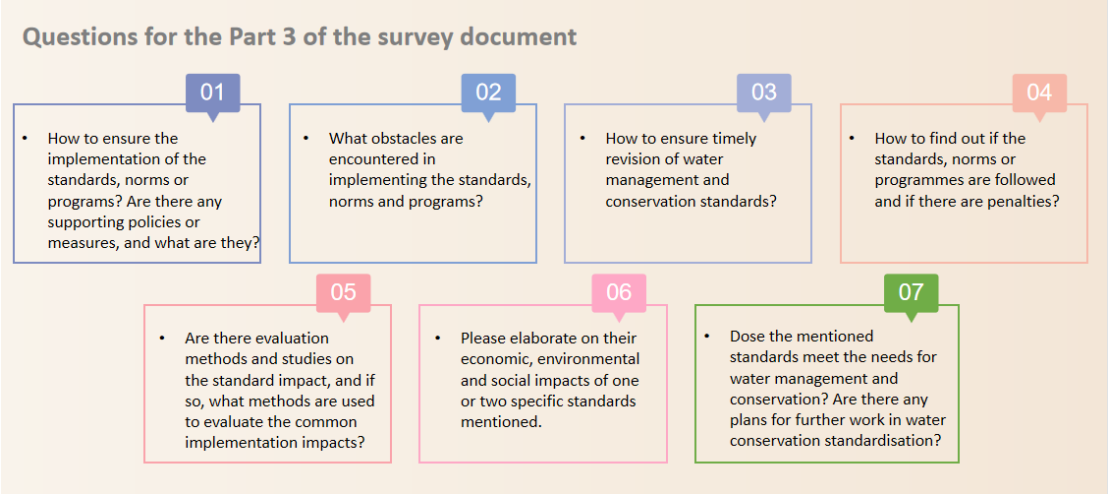

Figure 4. Questions for Part 3 of the Survey document.

3.2 Survey result

The survey document was disseminated through the APEC Secretariat and contact points of economies via e-mail, expecting to hear back from water-conservation policymakers, standard developers, household water appliance manufacturers, operators and service suppliers in APEC Economies. Up to October 2022, eleven experts from five economies, Australia; China; Chinese Taipei; Thailand and the USA, provided answers to the survey questions. The Summary of the Pre-Workshop Survey was conducted and the major water management and conservation programs and standards in the above active economies were summarized briefly below.

***Australia**: WELS scheme and Water Efficiency standards*

The Water Efficiency Labelling and Standards (WELS) scheme is an Australian government initiative in partnership with state and territory governments. It is mandatory and aims to conserve water use by reducing water consumption and informing consumers about water efficiency at the point of sale. The scheme was established in 2005 under the Commonwealth Water Efficiency Labelling and Standards Act 2005. Water efficiency standards detail the criteria for testing, rating and labelling products regulated under the WELS scheme. The typical standards in the WELS scheme are listed in Table 1.

Federal legislation and supporting state and territory legislation that empowers the WELS scheme and standards to be applied as a mandatory

scheme within Australia. The overarching legislation sets out a regular timely review of the scheme and it operates to ensure it is functioning and remains applicable to contemporary practices in industry and product development. The overarching legislation includes penalties for actions which are not compliant with the requirements of the standards in place. The functions of the WELS scheme include monitoring and compliance activities for the purpose of checking that regulated products are compliant with the requirements of the standards and legislation.

Table 1. Standards in the WELS scheme in Australia

No.	Serial number of standards	Name of standard	Scope of standard
1	AS/NZS 6400:2016	Water efficient products – rating and labelling	Rating of appliance water efficiency and requirements for water efficiency labelling and display
2	AS/NZS 2040.1:2021 AS/NZS 2040.2:2021	Performance of household electrical appliances – Clothes washing machines – Part 1 and Part 2	Method for measuring performance, energy and water consumption and energy labelling requirements
3	AS/NZS 2007.1:2021 AS/NZS 2007.2:2021	Performance of household electrical appliances – Dishwashers – Part 1 and Part 2	Method for measuring performance, energy and water consumption and energy labelling requirements
4	AS/NZS 2442.1:2021 AS/NZS 2442.2:2021	Performance of household electrical appliances – Rotary clothes dryers – Part 1 and Part 2	Method for measuring performance, energy and water consumption and energy labelling requirements
5	ISO 31600:2022	Water efficiency labelling programmes – Requirements with guidance for implementation	——

***China**: Water efficiency standards and labelling scheme and standards*

To improve the efficiency of household water use, China executes mandatory water efficiency standards to set market entrance barriers for household water appliances. In these standards, the core content is the water efficiency grade of water appliances. Water efficiency here refers to the maximum allowable water consumption of the products under the test conditions stipulated

in the standard and under the condition that the products meet the general technical requirements, functional requirements and matching technical requirements.

Mostly, there are 3 grades for the water efficiency of one appliance. Grade 3 is the limit value, used for supervision and elimination of backward production capacity. Grade 2 is the water-saving evaluation value, used for the water-saving evaluation of the products. Grade 1 is the advanced value and the benchmark for the water efficiency of similar products. Water efficiency grade is the key to implementing the water efficiency identification system of water products. The current water efficiency standards of China are shown in Table 2. Up to now, five water appliance categories, including water closets, smart water closets, showers, dishwashers and water purifiers, are listed in the water efficiency labelling scheme of China.

The China WELS is mandatory, and requires that all the manufacturers and importers within China mainland, China shall paste the water efficiency labels at the obvious locations of the products or minimum package of the products. China WELS adopts the mechanism of self-declaration of enterprises. Namely, enterprises will independently arrange the water efficiency indicator of the testing products, determine the water efficiency level, confirm the labelling information, and self-print and paste the labels. As the subject, enterprises shall be responsible for the labelling information and subject to market regulation.

Table 2. Water efficiency standards of China

No.	Serial number of standards	Name of standards	If listed in the Water efficiency labelling scheme
1	GB 12021.4-2013	The maximum allowable values of the energy, water consumption and grades for household electric washing machines	Not at the moment
2	GB 25501-2019	Minimum allowable values of water efficiency and water efficiency grades for faucets	Not at the moment
3	GB 25502-2017	Minimum allowable values of water efficiency and water efficiency grades for water closets	Yes
4	GB 28377-2019	Minimum allowable values of water efficiency and water efficiency grades for urinals	Not at the moment
5	GB 28378-2019	Minimum allowable values of water efficiency and water efficiency grades for	Yes

		showers	
6	GB 28379-2012	Minimum allowable values of water efficiency and water efficiency grades for flush valve for water closets	Not at the moment
7	GB 30717-2019	Minimum allowable values of water efficiency and water efficiency grades for squatting pans	Not at the moment
8	GB 34914-2021	Minimum allowable value of water efficiency and water efficiency grades for water purifier	Yes
9	GB 38448-2019	Minimum acceptable values and grades of the energy efficiency and water efficiency for smart water closets	Yes
10	GB 38383-2019	The minimum allowable values of the energy, water consumption and grades for dishwashers	Yes

Chinese Taipei: *Water Efficiency Label*

The water conservation policy of Chinese Taipei is now moved to regulatory intervention and mandatory use of water efficiency label. Toilets (one flush and dual flush) and washing machines were announced to bear Water Efficiency Label in 1 April 2018. Water equipment installed in public facilities, such as flush urinals (effective on 1 July 2021), induction faucets (effective on 1 July 2022) and auto-closing faucets (to be effective on 1 October 2023) has been added to the scope. Products purchased by consumers from the marketplace are already certified products. Chinese Taipei formulates and executes one water conservation standard and four norms for water appliances. They are listed in Table 3.

Checks and inspection of products required for bearing the Water Efficiency Label are carried out each year. Manufacturers (agents), distributors and e-commerce platforms are targets of the surveillance. Meetings with manufacturers (agents) of Water Efficiency Label products are held annually to review water product specification standards or recommendation for specification standards. The information provided by distributors on water efficiency label products on e-commerce platforms is insufficient, which includes issues such as suspended production, expired licenses, delays in removing webpages of products that do not have the Water Efficiency Label, and improper labelling of product types.

Table 3. Water-conservation standards and norms of Chinese Taipei.

No.	Name	Scope and Main Content
1	Article 95-1, Water Supply Act	• Water equipment designated to be subject to the Act and placed on the market shall bear the Water Efficiency Label. • Legal basis for Water Efficiency Label. • Legal basis for designating the type, scope and effective date of water equipment that is required to bear the Water Efficiency Label.
2	Article 98-1, Water Supply Act	Water equipment violating Paragraph 1, Article 95-1 of the Water Supply Act is subject to fines for each violation.
3	Regulations for Management of Water Efficiency Label	Issuance, labelling methods, validity period, extension, rescission, withdrawal and sale of Water Efficiency Label; inspection of installation; product specification standards.
4	Water equipment, sanitary ware and other equipment required for bearing Water Efficiency Label	Announcements for the type and scope of products as well as the effective date of implementation of the Water Efficiency Label.
5	Directions Governing Imposition of Penalties on Violations against Article 98-1, Water Supply Act	Criteria and procedures for determining penalties to implement Article 98-1, Water Supply Act, including audit methods, audit procedures and amount of fines to be imposed.

Thailand: *Water Efficiency Standards and Water Saving Label Project*

Water Saving Label Project has its main objective is to create awareness of the valuable use of water in Thai society. Table 4 lists the three mandatory water efficiency standards enforced in Thailand, which apply to imported goods. These standards include the Water Saving Efficiency Classification Standard Guidance, which is part of the TIS standard on water saving, as well as the ISO 9001 Quality System Standard and the ISO 14001 Environmental Management System Standard. These guidelines are used to determine which products consume an appropriate amount of water and are awarded the Water Saving Label certification.

By choosing products with this label, consumers can save on household expenses and help promote water conservation awareness. Additionally, using less water can help reduce wastewater and protect the environment. The Metropolitan Waterworks Authority (MWA) conducts random inspections of products with Water Saving Labels, and entrepreneurs who do not comply with

the rules outlined in the manual or who use an uncertified label will face suspension.

Table 4. Water efficiency standards in Thailand.

No.	Serial number	Name	Scope and Main Content
1	WF-001-2	Water-saving efficiency classification standard: water-saving faucet	• Criteria for classification of water saving efficiency levels • Procedures and documents used for applying for a water-saving label claim • Rules after receiving the water-saving label
2	WF-002-2	Water-saving efficiency classification standard: Water-saving shower	• Criteria for classification of water saving efficiency levels • Procedures and documents used for applying for a water-saving label claim • Rules after receiving the water-saving label
3	WF-003-0	Standards for classifying water saving efficiency: Faucets for sink	• Criteria for classification of water saving efficiency levels • Procedures and documents used for applying for a water-saving label claim • Rules after receiving the water-saving label

The USA: *US EPA WaterSense specification and LEED programs*

The USA carried out US EPA WaterSense specification and LEED programs. Different states may have their own regulations. The US California Energy commission formulated the Appliance Efficiency Proceedings- title 20, Mandatory for products offered for sale in California, to manage the water efficiency for faucets, showerheads, water closets and urinals. For the CEC title 20, mandatory standard, products not compliant will be ordered to push off the shelf, and manufacturers or distributors will be charged a monetary penalty. As voluntary standards, the consumer receives rebates when purchasing WaterSense labelled products, and LEED certified buildings will qualify for tax rebates and zoning allowance.

WaterSense, a voluntary partnership program, is a label for water-saving products. WaterSense-labeled products and services are certified to use at least 20 per cent less water and perform as well as or better than regular models. It covers products including residential and commercial toilets, showerheads, bathroom faucets, urinals, irrigation controllers, spray sprinkler bodies, and pre-rinse spray valves.

LEED provides a framework for healthy, efficient, carbon and cost-saving green buildings. LEED certification is a globally recognized symbol of sustainability achievement, and it is backed by an entire industry of committed organizations and individuals paving the way for market transformation.

4. Workshop

On Feb 2-3, the workshop has been held virtually on the ZOOM platform. 10 speakers presented at the event, and 27 participants attended the meeting. They are from Australia; China; Japan; Malaysia; the Philippines; Singapore; Thailand and the USA. 48% of participants and 30% of speakers are females.

There are nine presentations and two discussion session were carried out on the event. The speaking topics involve the Water Efficiency Standards, Water Efficiency Labelling Scheme, environmentally friendly sanitary wares and faucets, water reuse, water resources management, practices and water stewardship, and so on. And the experts discussed the mutual recognition of test methods, results and labelling, and how to spread, implement and application of the water management standards. The workshop agenda is shown below.

The APEC Workshop on Best Practices Sharing of Water-Conservation Standards and Evaluation on Their Benefits

Workshop Agenda

On virtual, 2-3 February 2023

Time (Beijing Time)	PROGRAMME
Day 1: Water efficiency standards and their benefits in APEC regions	
18:00 – 18:05	Welcome address
18:05 – 18:20	• Workshop Overview; • Introduction of the participants and Family photo; • Adoption of Agenda
18:20 – 19:35	Presentations and Q&A: • **Water efficiency effectiveness of the WELS Scheme and regulatory interrelationships** *(from Australia)* • **Analysis and Application of Australian Water Conservation Standards and Policies** *(from Australia)* • **The Role of Standardization in Transitioning to a Water Efficient Economy** *(from the USA)* • **Efforts toward environmentally friendly sanitary wares and faucets** *(from Japan)* • **Introduction to China's Water Efficiency Labeling Scheme** *(from China)*
19:35 – 19:55	Panel Discussion: • **Mutual Recognition of Test Methods, Results and Labeling**
19:55 – 20:00	Review of Day 1 and Preview of Day 2 activities
Day 2: Water Resources management standards, practices and their impacts	
18:00 – 18:10	Introduction
18:10 – 19:25	Presentations and Q&A: • **Global water reuse situations and guidelines** *(from China)* • **Water Resources Management in the crisis of Sea Water Intrusion in the lower Chao Phraya River Basin** *(from Thailand)* • **The Practices of Water Stewardship in China** *(from China)* • **The AWS Standard and its implementation in Asia Pacific** *(from Australia)*
19:25 – 19:45	Panel Discussion: • **Spread, implementation and application of the Water Management Standards**
19:45 – 20:00	Review of Day 2 activities; Concluding Session and Follow-up Arrangements

Figure 5. The workshop agenda of the project.

4.1 Presentations

• *Water efficiency effectiveness of the WELS Scheme and regulatory interrelationships*

The expert speaker from Australia shared his experiences with the development of water efficiency standards in Australia and the evolution of the WELS scheme and its impact on water conservation efforts.

During the 2001-2009 drought in Australia, WELS became a matter of national security and led to the reform of water management in Australia. Mandating and legislating the WELS scheme in 2005 formed part of that response. The objective of the Act was to conserve water supplies, provide information for purchasers of water-using products, and promote the adoption of efficient and effective water-saving technologies. The WELS scheme comprises seven regulated products specified in AS/NZS 6400, which consume 80% of in-house water. The WELS label provides consumers with information on the water efficiency of products. The average savings per person per day across Australia is 12.4 L, predicted to grow to 19.5 L.

• *Analysis and Application of Australian Water Conservation Standards and Policies*

Australia's policies and standards for water conservation in three aspects was discussed. These policies and standards have resulted in significant benefits, such as $1.47 billion in savings in utility bills and the reduction of the proportion of new dwellings with low water efficiency.

First, for suppliers and manufacturers, they have the watermark and wealth schemes to ensure water efficiency and compliance with standards. Second, for builders and developers, they have the Building Sustainability Index (BASIX) that sets minimum sustainability targets for new and renovative homes, while the Green Star rating is used for commercial and industrial buildings. Lastly, for consumers and proprietors, there are policies such as the Queensland government's tendency policy, which limits the landlord's ability to charge tenants for water bills, and the Water Fix program, which helps subsidize people to fix

and replace their leaky devices.

- *The Role of Standardization in Transitioning to a Water Efficient Economy*

Works and progresses in water conservation in the United States was introduced. Best practices on standardization are needed to address this water scarcity issue, and the US has made progress since the mid-1980s in reducing flow rates and consumption values of water-consuming products.

The transformation process starts with the development of standards through a consensus process, which is important to all aspects of supply chain government governance. Construction codes are used to inspect buildings, and they reference hundreds of standards, while regulations are laws enacted by a governmental body. Specifications are a set of technical requirements for a specific product, and the *WaterSense* program provides manufacturers with an opportunity to label their products if they meet the specifications. The program has delivered impressive impacts on water efficiency in the US economy since 2006.

- *Efforts toward environmentally friendly sanitary wares and faucets*

The expert speakers from Japan provide an overview of Japan's environmental efforts related to water conservation and hot water usage.

Saving water is not only important to reduce consumption but also to reduce electricity use for water treatment and, consequently, CO_2 emissions. Water efficiency is achieved through the use of anti-stain technology, promoting cleanability and quietness, and improving flushing sequences. In Japan, water-saving water closets and urinals have evolved, with dedicated built-in flushing devices, providing a high level of performance and water efficiency. Hot water-saving criteria in Japan are classified into A, B, and C categories, and it stipulates the hot water-saving performance of faucets and showers. The concept of the hot water saving process is to reduce usage time, wasteful use of hot water, and reduce energy consumption.

- *Introduction to China's Water Efficiency Labeling Scheme*

China's Water Efficiency Labeling Scheme was presented in this part, which consists of water efficiency standards for different product categories and a mandatory labelling scheme.

China's water efficiency standards are formulated and published for each product category separately, with each product having a standard serial number. The water efficiency indicators of the products are divided into different levels, with the third or fifth level being used as the limited value of water efficiency. The Water Efficiency Labeling Scheme is based on uniform water efficiency standards, releases a uniform product catalogue and implementation rules, and requires all manufacturers and importers within China to paste the water efficiency labels on the products' packaging. The scheme is enforced through all forms of supervision and inspection.

- *Global water reuse situations and guidelines*

A presentation on global water reuse situations and guidelines towards sustainable water reuse was given. The presentation outlined the current global water use situation, stating that over 2 million people live in areas of high water stress, which will increase to 3.9 billion by 2050, with over 80% of wastewater released to the environment without adequate treatment.

The presentation discussed the challenges and potentials of wastewater reclamation and reuse, with potential applications being non-portable reuses, and indirect and direct portable uses. He noted the need to ensure water safety and reliability while comparing reclaimed water to drinking water. The expert speaker also mentioned the international standards and guidelines on water use and discussed the work of the technical committee of water use, which has published over 32 international standards since its establishment in 2013-2014, including guidelines for water reuse in urban areas.

- *Water Resources Management in the crisis of Sea Water Intrusion in the lower Chao Phraya River Basin*

The expert speaker from Thailand discusses water resource management and controlling seawater intrusion in the lower shopping river basin. The integrated water resource management system is used to tackle water crises

and balance water amounts for multiple users in various seasons.

The presentation explains the purpose of water use, including consumption, ecosystem preservation, agriculture, and industry, in which consumption is the most important. To control salinity, water is released from reservoirs, and monitoring systems are used to measure salinity levels. The presentation also highlights the effect of seawater intrusion on agricultural areas, including durian and mango crops, and the importance of maintaining sanity levels to produce high-quality products. Finally, the presentation discusses the challenges faced due to low rainfall and increasing water use, along with water discharge monitoring systems.

- *The AWS Standard and its implementation in Asia Pacific*

The expert speaker from Australia has spoken about the Alliance for Water Stewardship (AWS) standard, which is a voluntary international water stewardship standard, aimed at driving positive impacts.

The mission of AWS is to provide an architecture in which leadership can flourish. Water stewardship is a user-driven approach that accommodates multiple demands positively impacting communities, the environment, and the economy. AWS works within markets to drive positive change and is involved in defining the essential elements of good water stewardship, contained within the AWS standard. As a standard-setting body, AWS provides a system of recognition for those who meet the requirements of the standard through third-party certification to make credible claims about good water stewardship performance.

- *The Practices of Water Stewardship in China*

The speaker from China introduced the water stewardship practices in China, which are based on two standards, namely the national standard and the association standard.

The national standard, called the *Assessment Requirements for Water Stewardship*, lays out the essential and advanced requirements for conducting

localized assessments of water stewardship practices in five steps. The association standard specifies the assessment index, system, methods, and grading for the quality of water stewardship services and enterprise standards. The practices are mainly carried out in sales, certification, and compliance verification. The Suzhou industrial park is a typical project in water stewardship practices and was awarded a gold-level certificate for passing the certification of the international water stewardship standard.

4.2 Discussions

- *Mutual Recognition of Test Methods, Results and Labeling*

The conversation revolves around the importance of establishing a universal water efficiency standard and mutual recognition of test methods, results, and labeling among economies in the APEC region. ISO 31600 is seen as a starting point for developing a flexible labeling program that can accommodate different realities and plumbing systems of different economies. The speakers also discuss the importance of unified testing methods and product specifications and mention the successful adoption of ISO 31600 by 35 economies. They express optimism about the possibility of a universal standard in the future and emphasize the need for continued cooperation and collaboration.

- *Spread, implementation and application of the Water Management Standards*

The discussion revolves around water management standards and programs. The speakers praised the presentations that were given and emphasized the need to identify the commonalities and differences among water management standards and programs. The group discussed the implementation of large-scale voluntary or mandatory labeling programs and consumer satisfaction surveys. There is a need to compile information from different economies to understand what customers want and how to communicate the benefits of these programs. The Australian representative noted the importance of specifying relevant volumes for proper consumer operation without going down to zero, as some amounts are necessary for efficient functioning.

5. Recommendations

Water scarcity is a major concern in the APEC region, and it has become increasingly important for effective strategies to improve water efficiency and reduce water consumption. One of the most promising ways to achieve this is through the use of water efficiency labelling and standards for water appliances. While some economies in the region have already adopted their own water-efficiency labelling and testing methods, it is also crucial to promote a universal standard across the region. This will require mutual recognition of testing methods, results, and labelling among economies, and the adoption of ISO 31600 as a starting point for developing a flexible labelling program that can accommodate the different plumbing systems and realities of different economies.

To achieve a universal standard in the future, it is important to continue cooperation and collaboration in the region. This will require ongoing efforts to establish common testing methods and product specifications and to promote the adoption of ISO 31600 by all economies in the APEC region. By doing so, we can ensure that water efficiency is prioritized and effectively managed across the region, mitigating the risks of water scarcity and promoting sustainable development. Therefore, it is crucial for APEC economies to work together towards a common goal of achieving water efficiency, and to establish a robust and effective framework that can support ongoing progress in this area.