

Change
for Better 
CARE

Clean & Clear Water with Care

Change for Better Care



Vision

To be a
high-performance water
supply organization with
excellent corporate
governance and reach
international standard

Missions

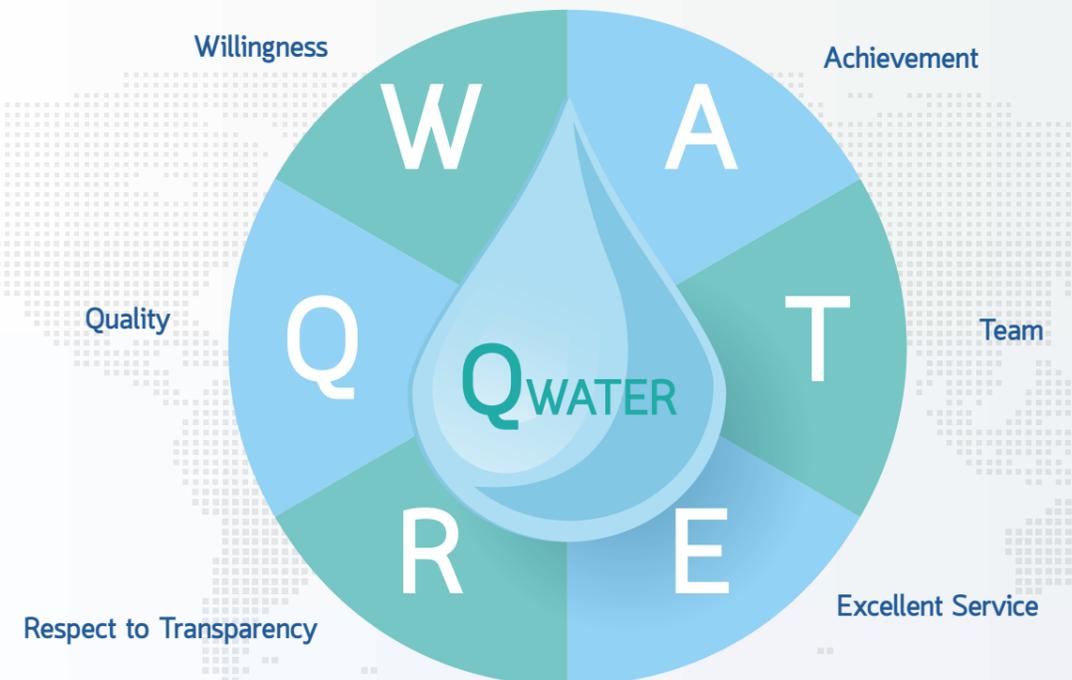
- 1 Develop organization growth and sustainability
- 2 Implement Water Safety Plan according to WHO standard by assuring the stability of raw water resource and transmission
- 3 Deliver professional water supply service to satisfy the stakeholder needs and balance stakeholder needs
- 4 Improve people's quality of life by expanding water services and social responsibility all over service areas

Value

Determination to develop oneself
and work for public services with transparency
and focus on quality (QWATER)



"VDO on
QWATER"



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About This Report

Since 2013, the Metropolitan Waterworks Authority (MWA) has compiled sustainability reports to distribute information and communicate about its sustainability management guideline as well as its economic, social and environmental performance. MWA also started compiling the reports based on the Sustainability Reporting Standards of Global Reporting Initiative (GRI) in 2016.

The Sustainability Report 2020 presents MWA operations between 1 October 2019 and 30 September 2020 in accordance with the GRI Standards: Core Option and underlines MWA commitment to support Sustainable Development Goals (SDGs).

This report also features MWA progress that aligns with Thailand's 20-year national strategy, which places an emphasis on developing the country's

foundation on the basis of security, prosperity, and sustainability and preparing its smooth transition into Thailand 4.0 in line with the 12th National Economic and Social Development Plan. Also presented in this report are MWA works that resonate with the Digital Economy and Society Development Plan, the Ministry of Interior's Strategy, State Enterprise for Public Utilities Strategy, SDG6: Clean Water and Sanitation, SDG9: Industry, Innovation and Infrastructure, SDG11: Sustainable Cities and Communities, SDG12: Responsible Consumption and Production, and SDG17: Partnerships for the Goals. This sustainability report mainly presents key information that stakeholders look for and includes operating results that are important to MWA.



For references, any additional information, or Annual Report 2019 of MWA in digital format, please visit www.mwa.co.th or scan QR Code

For More Information



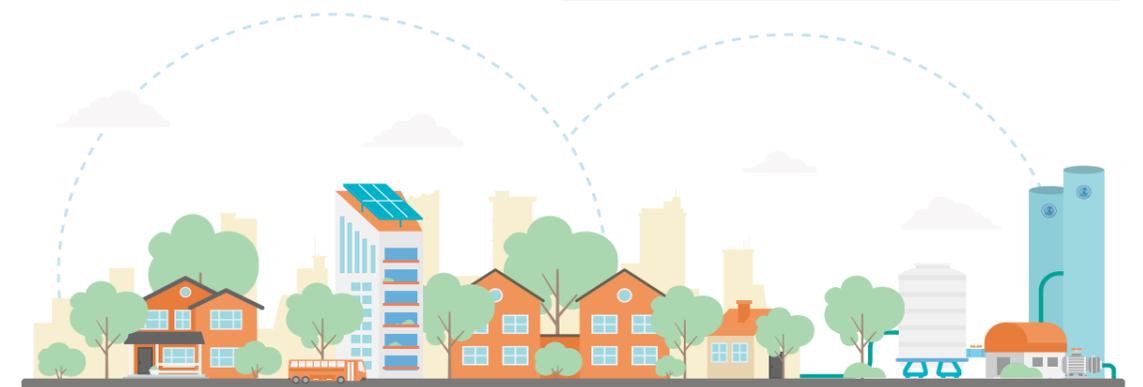
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Message from the Governor Sustainability Report 2020

For more than 54 years, MWA has served people and contributed to Thai society based on its “Waterworks for People” aspiration. MWA, just like the Ministry of Interior, aims to “ease people’s suffering and promote their happiness”. Not only that MWA has constantly pursued further development, but it has also integrated its operations into all relevant contexts.

In the digital era adaptability and development are key tools that must be deployed alongside pro-sustainability mechanisms. They must address the management of water resources that are the main cost of waterworks operations; raw-water quality control; water-production-system management; water-delivery management; water-loss management; mass communication; as well as networking with stakeholders across all sectors. Work in all these aspects should be integrated for efficiency and effectiveness, which will support security and sustainability in the long run.

The current situation has required MWA to review and adjust its strategies on a continued basis so as to minimize any adverse impact from various incidences. Climate Change, for example, has prolonged the invasion of seawater encroached freshwater zones. The shortage of raw water, meanwhile, is closely related to the allocation of water resources among river basins. The COVID-19 outbreak, in particular, has hit all sectors in the world. The pandemic has also affected the financial stability of all state organizations directly or indirectly, as well as MWA’s efforts to solve its infrastructural problems in the medium and long terms.

MWA, however, has implemented several projects to help people and ensure the continuity of its waterworks services throughout such time. Its “Change for Better CARE” campaign aims to strengthen, improve and provide increasingly comprehensive and safe waterworks, to raise the satisfaction of people and all stakeholders, to help people affected by the pandemic, and to assist farmers affected by brackish water. Moreover, MWA has conducted several projects to prevent water loss. It has also designed its assistance in the most tangible manner possible.

This Sustainability Report 2020 has been compiled based on Global Reporting Initiative (GRI) Standards. Presenting sustainable-development information in all aspects, this report aims to communicate about MWA’s vision, concept, process and management approach for the goals of achieving long-term security and sustainability. MWA has already won the Sustainability Disclosure Award for two consecutive years from the Securities and Exchange Commission, the Stock Exchange of Thailand, and the Thaipat Institute. The accolades have not only been the pride of MWA, but they have also reflected constant development of waterworks infrastructure for ongoing security and sustainability.



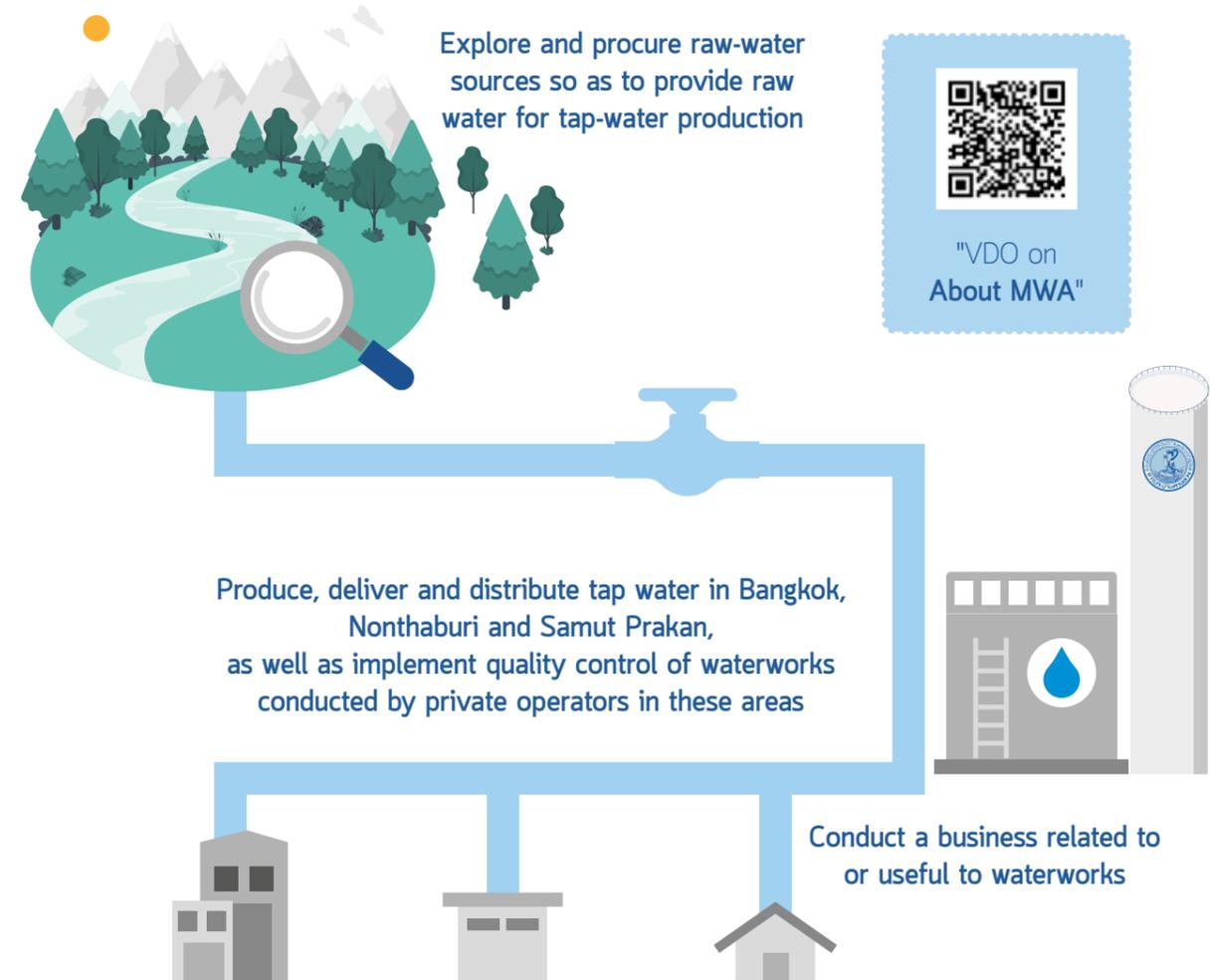
Mr. Kavee Areekul
Governor of the Metropolitan
Waterworks Authority



About MWA

About MWA

The Metropolitan Waterworks Authority (MWA) was established on 16 August 1967 through the merging of four waterworks authorities based in three provinces, namely the Bangkok Waterworks Office, the Thonburi Municipal Waterworks Office, the Nonthaburi Waterworks Office, and the Samut Prakan Municipal Waterworks Office. MWA, a state enterprise under the supervision of the Ministry of Interior, has the duty to fulfill the objectives laid down in the Metropolitan Waterworks Authority Act as follows:

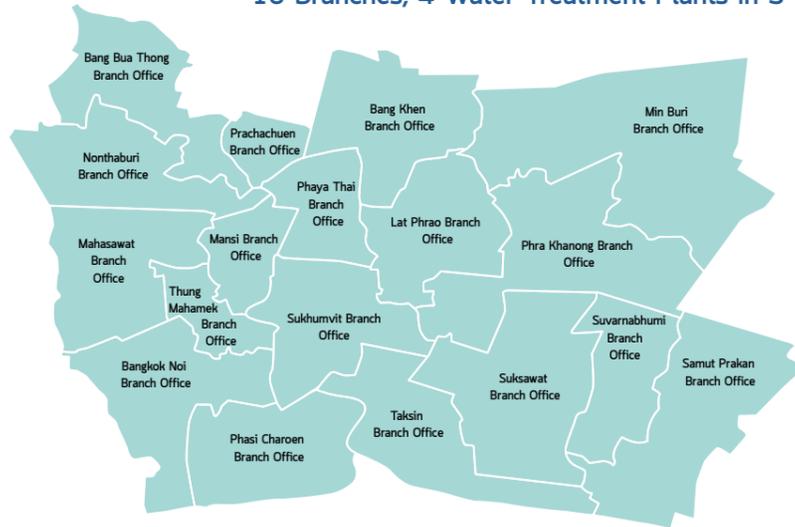


MWA has managed waterworks in Bangkok, Nonthaburi and Samut Prakan based on the World Health Organization's water-quality standard. It has paid attention to water quality from upstream to downstream levels so as to comprehensively and adequately provide people with safe and clean water. In addition, MWA has integrated innovations and technologies to its constant waterworks development. Its Water Safety Plan (WSP) has been drawn up as an assurance of water quality and safety. Also, it has replaced water pipelines in various areas and has promoted relation with communities in the western and eastern bank of the Chao Phraya River for purpose of water-resource conservation. All these efforts are designed to increase the efficiency of waterworks infrastructure on a sustainable basis.

MWA Service Areas

MWA has distributed water across 3,195 square kilometers of areas in Bangkok, Nonthaburi and Samut Prakan. Its two raw-water sources, namely the Chao Phraya River and the Mae Klong River, support its tap-water production, transmission, and distribution. At present, MWA has delivered tap water to all urban zones in the three provinces giving their residents access to clean and safe tap water, which enhances their quality of life. MWA services are in line with the UN Sustainable Development Goal 6 (SDG 6) and the “Ease Sufferings, Nurture Happiness of People” policy of the Ministry of Interior, which supervises MWA.

18 Branches, 4 Water Treatment Plants in 3 Provinces, Comprehensive Coverage



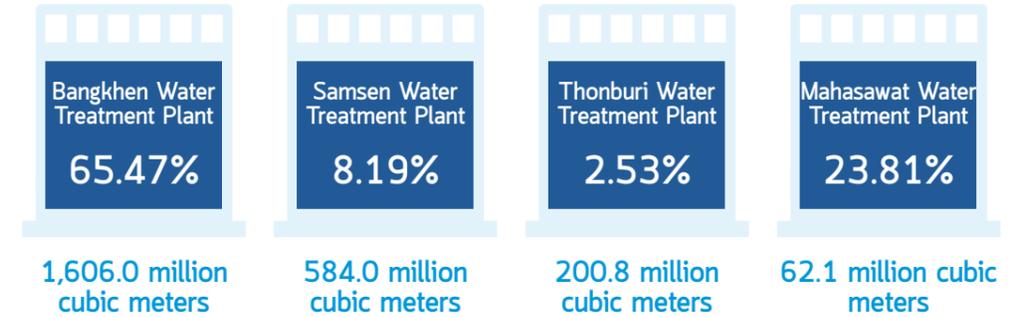
MWA has 18 branches across 3 provinces (Bangkok, Nonthaburi and Samut Prakan) under its jurisdictions plus 4 water treatment plants.

11 Main Workplaces



Water Treatment Plants

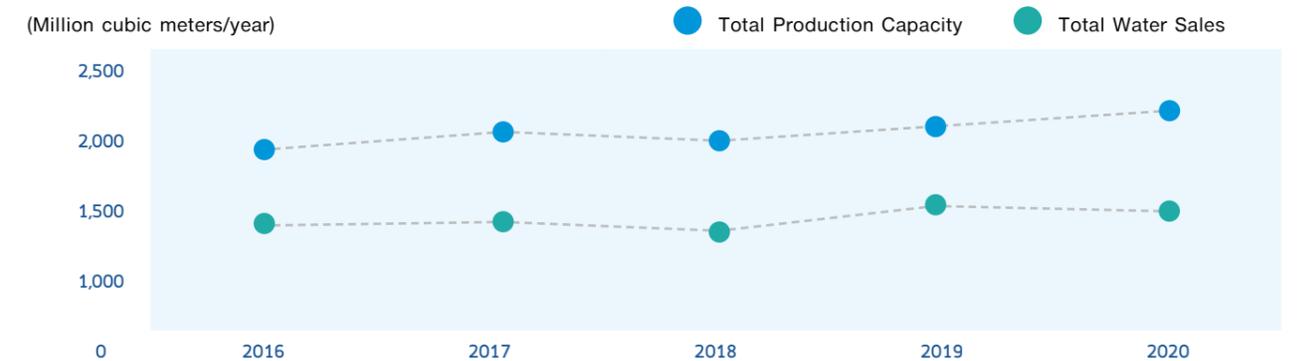
Total Production Capacity 2,452.9 million cubic meters/year



Total Water Production and Sales of 4 Water Treatment Plants

	Fiscal Year				
	2016	2017	2018	2019	2020
Total Production Capacity (million cubic meters/year)	1,965.9	2,063.8	1,997.1	2,075.2	2,121.1
Bang Khen Water Treatment Plant	1,290.9	1,404.5	1,334.4	1,402.3	1,410.0
Samsen Water Treatment Plant	129.7	120.7	116.4	113.0	102.4
Thonburi Water Treatment Plant	30.9	40.5	37.4	41.1	36.4
Mahasawat Water Treatment Plant	514.4	498.1	508.9	518.8	572.3
Total Water Sales (million cubic meters/year)	1,406.3	1,408.6	1,401.4	1,467.4	1,458.3

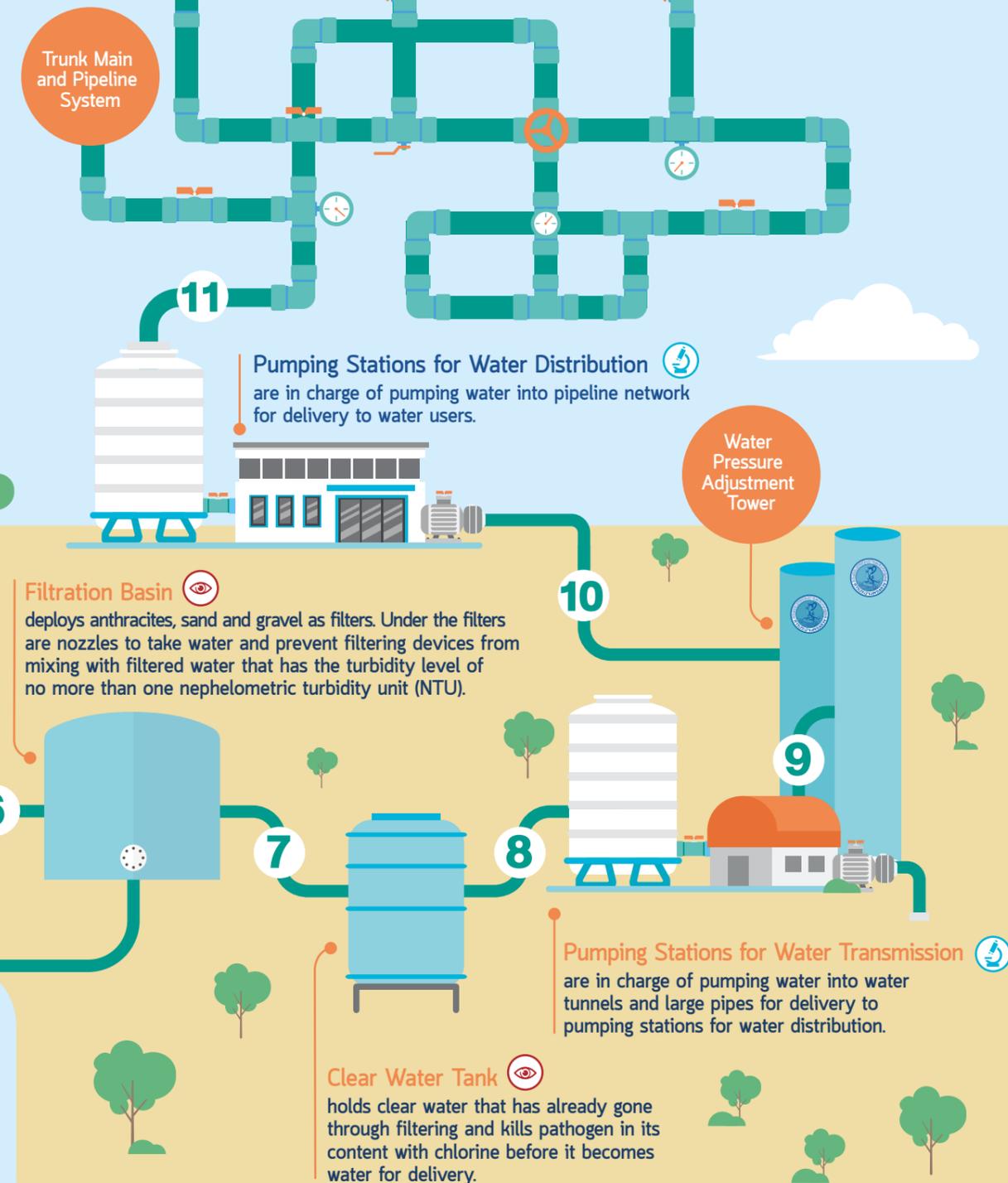
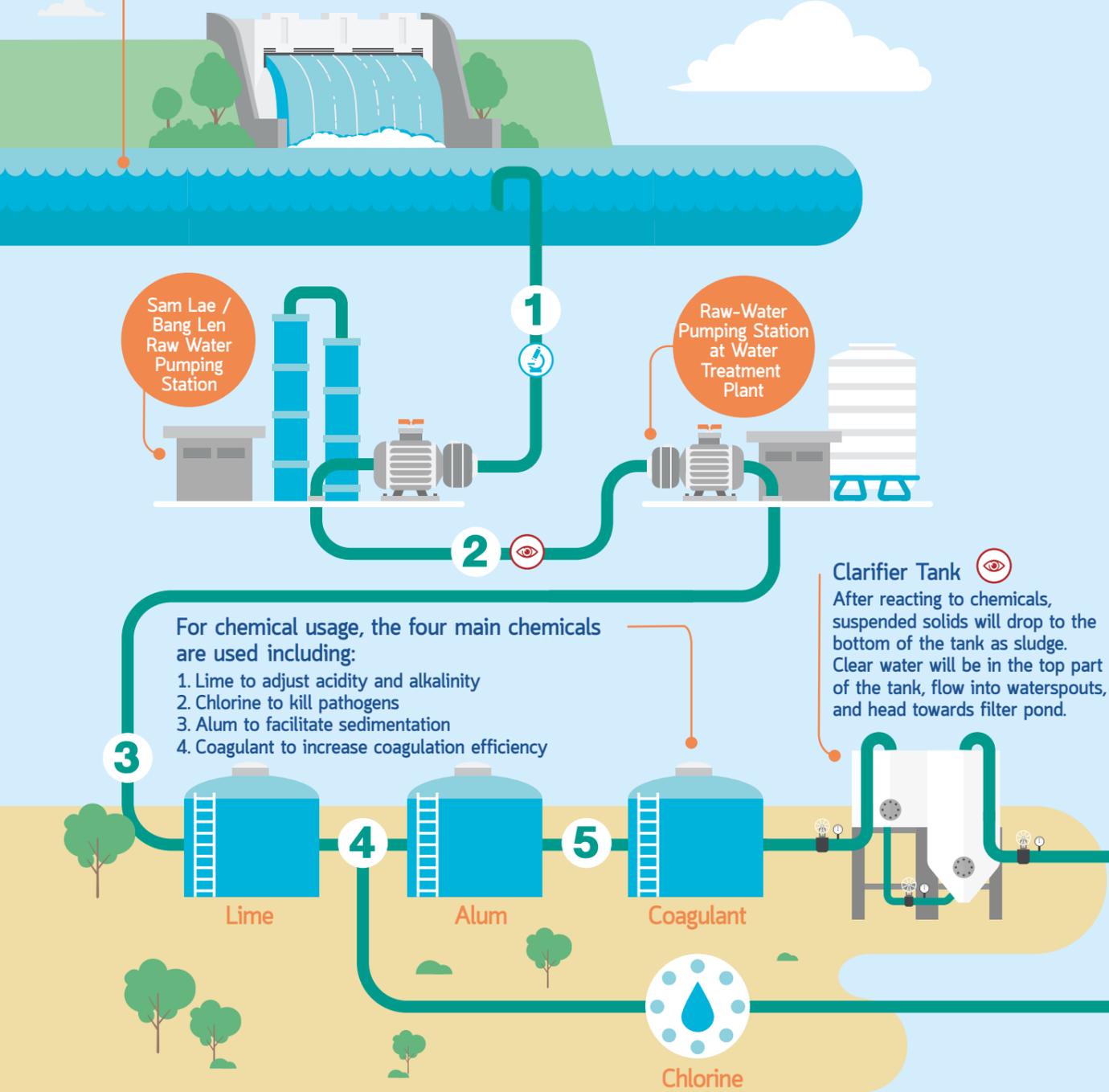
Comparison Chart of Total Production Capacity and Total Water Sales (Million cubic meters/year)



Tap Water Production Process

Raw-Water Sources

1. Chao Phraya River around Ban Krachaeng Sub-district in Pathum Thani's Mueang District
2. Mae Klong Dam in Kanchanaburi's Tha Muang District

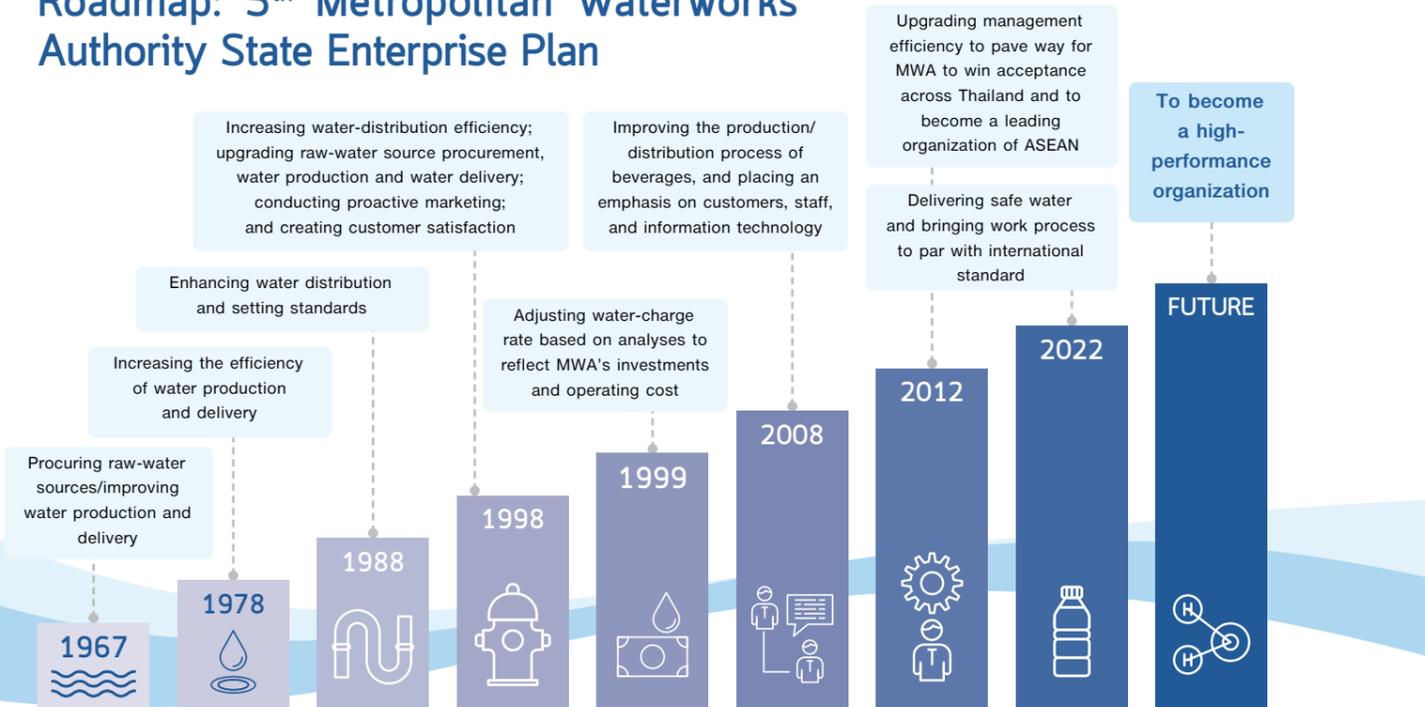


Note

- Water quality monitoring and water analyses for the production system are done at water treatment plant's lab that is certified based on ISO 9001:2015, ISO 14001:2015 and HACCP standards.
- Water quality tests are done based on MWA's water quality criteria at Water Quality Department's lab that is certified by ISO/IEC 17025:2005 standards.

MWA...Today & Tomorrow

Roadmap: 5th Metropolitan Waterworks Authority State Enterprise Plan



Policies and Future Plan

The 5th Metropolitan Waterworks Authority State Enterprise Plan, which comprises four strategies, provides a framework for MWA management. Developed under the national strategy (2018 - 2037), the plan mainly pursues sustainable development through organizational improvement and increasing competitiveness in support of MWA's goal to be a high-performance organization. The plan also prescribes contributions to economic and social development, environmental friendliness, and development efforts that will usher Thailand towards a secure, wealthy and sustainable country in line with MWA's vision to "be high-performance water supply organization with excellent corporate governance and reach international standard".

Vision	Indicators	2022 Target Review Results	Criteria/ Comparative Country	Target/ Comparator's Performance
To be a high-performance organization	HPO Standard Thailand Quality Class (TQC) Award	Over 350 points (by 2021)	TQC Criteria	Over 350 points
To provide waterworks services at international standards	Water Quality Water Quality at Users' Place: Turbidity	Normal situation 1.0 NTU at 95 th Percentile	WHO's 2017 Recommendation [not more than 4 NTU (A) P.228]	At the place of consumption less than 1.0 NTU
	Water Distribution Water-Loss Rate	19%	- Pub (Singapore) - PWA	5.1% 31.3%
To uphold good governance	Corporate Governance Integrity/ Transparency Scores	Over 90 points or ranking among Top 5 State Enterprises	ITA Criteria	Over 90 points



Vision:

To be high-performance water supply organization with excellent corporate governance and reach international standard



1st Area: Building Stable and Secure Waterworks System

Objectives

- To restore worn-out pipelines to working conditions on a sustainable basis with ability to efficiently handle stronger water pressure;
- To enhance the efficiency of water manufacturing, transmission, and delivery systems;
- To increase water production capacity in the western side by 0.8 cubic meters, to construct water-transmission tunnels, to build more clear water tanks, and to construct the Bang Mod Pumping Station for water transmission; and
- To develop/improve waterworks infrastructure



2nd Area: Upgrading MWA to Organization of Excellence

Objectives

- To boost analytical skills among MWA personnel and set the specialize unit experiment Big Data analyses and applications for maximum benefits;
- To increase digital-service channels, to upgrade virtual branches' services, and to create customer satisfaction;
- To prepare automatic management and responses to threats, and draw up a playbook or set up a system to efficiently tackle cyberthreats;
- To promote research & development of work processes, as well as waterworks innovations in all aspects;
- To formulate policies for the upgrade of geographic information system (GIS) to Enterprise GIS so as to apply GIS to all MWA's key work processes



3rd Area: Promotion of Good Relationship with Stakeholders and Adherence to Good Governance for Sustainability

Objectives

- To respond to customers' needs and expectations; to efficiently resolve complaints; and to increase water users' satisfaction and confidence;
- To support MWA's upgrade to a high-performance organization based on good governance; and
- To give people living in areas under MWA's responsibility access to basic public utilities; to response to customers' basic needs; to increase water users' satisfaction; to strengthen MWA's focus on delivering top services; and to boost public confidence in MWA brand



4th Area: Creating Organizational Security

Objectives

- To explore approaches to raise revenue from key business (tap water); to build MWA's financial security; and to lay down clear guideline on how to expand service areas along provincial border lines that have potential; and
- To generate revenue from supplementary businesses that ride on MWA's customer base, experiences, expertise, innovations, and waterworks; and to create service users' satisfaction

MWA Value Chain

MWA's key mission is to deliver quality tap water and services in response to customers' needs based on work guideline, standard operating procedures, and good-governance principle. Its work process has three main parts:



Management Process

This process requires participation of executives at all levels to pursue the fulfilment of goals/targets and to set direction for the future, and also to pursue MWA growth and sustainability.



Core Process

With direct impacts on the fulfilment of MWA goals, this process delivers value to service users and stakeholders. It covers Operation that is related to products; Quality & Efficiency that is about the delivery of quality and efficient tap water; and Customer services that focus on commitment.



Support Process

It supports core process to ensure the fulfilment of goals and smooth organizational management with an emphasis on Efficiency & Effectiveness.

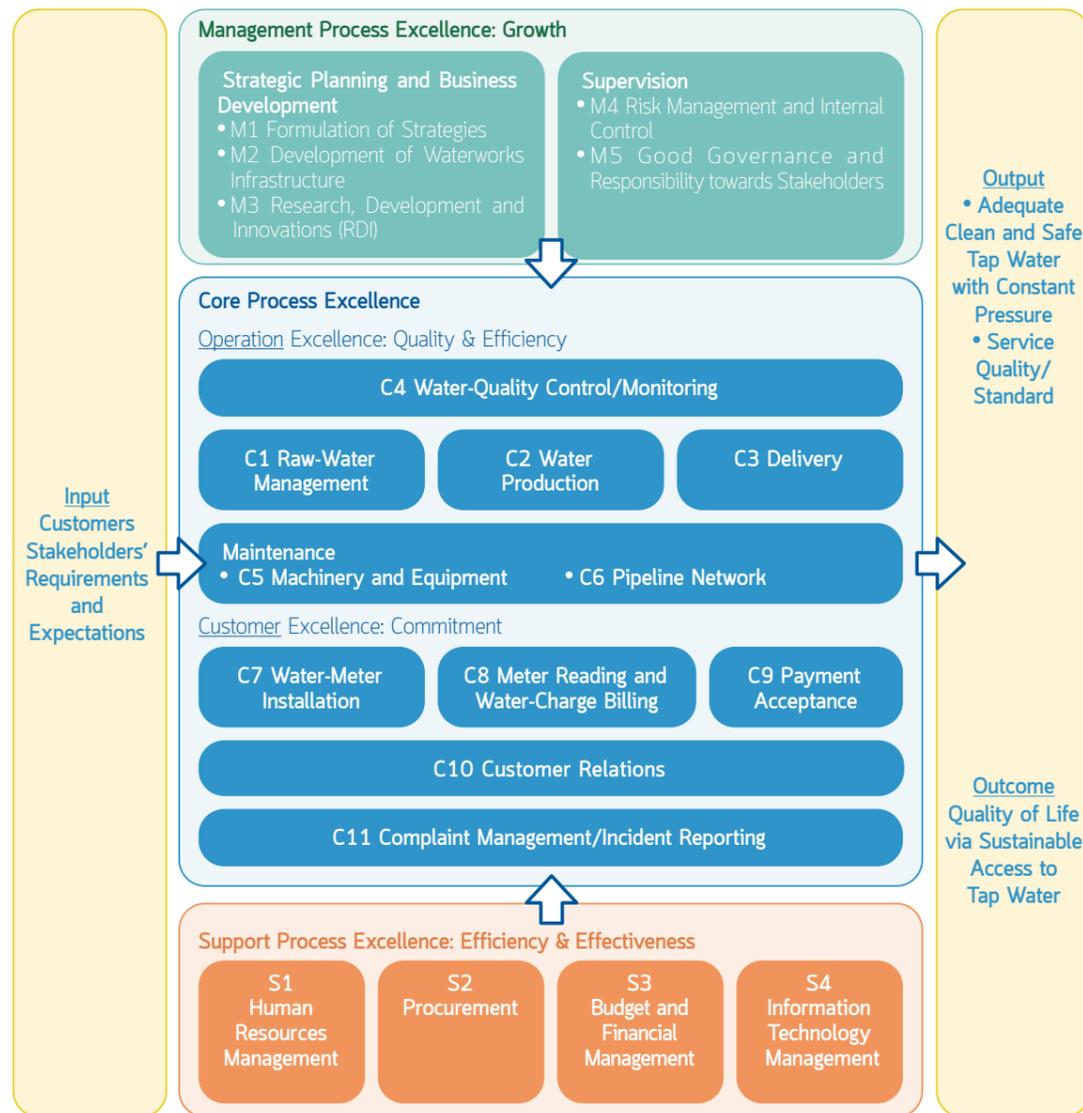
All these processes aim to adequately deliver valuable products and services to customers and stakeholders across all service areas, and support Thailand's economic and social development on a sustainable basis.



Supply Chain Management and Sourcing

The process to manage business activities, right from the intake of raw materials and resources, to the work-flow structure, and to relevant technologies aims at ensuring the efficient delivery of products/ services that respond to customers' quality requirements within timeframe set by customers. This process also governs procurement guidelines so as to procure raw materials and services that properly answer to MWA's business activities.

MWA Ethical Code means a guideline for good practice, which applies to MWA's core business and related businesses. This code is under the moral and ethical framework that treats all stakeholder groups equally, promotes MWA's good image, and protect its interests. Placing an emphasis on MWA's responsibility for partners and/or creditors, MWA Ethical Code prescribes the followings:



MWA shall strictly comply with agreements made and shall not violate the rights of partners and/or creditors.

MWA shall protect stakeholders' interests. For example, in an event that MWA is unable to comply with agreements, it shall inform partners and/or creditors in advance so that they can immediately explore solutions together.

MWA shall promote fairness and equality among partners and/or creditors with transparency and accountability.

MWA shall honor its anti-corruption policy by "neither paying nor receiving any form of benefits in a dishonest manner to or from partners and/or creditors".

MWA has entered into agreements with the following legal entities according to the Civil and Commercial Code which has operated domestically. The details are as follows:

Payments for Project/Non-Project Works

Unit: Baht

	2020	2019	2018	2017	2016
Thailand					
Project Works	498,835,504.76	403,279,647.33	526,182,824.42	432,150,912.09	539,163,372.02
Non-Project Works (Purchases, Hiring)	9,875,415,180.56	8,500,201,180.31	7,781,971,749.05	8,446,005,954.45	8,059,199,625.54
Total	10,374,250,685.32	8,903,480,827.64	8,308,154,573.47	8,878,156,866.54	8,598,362,997.56
Overseas					
Project Works	-	-	-	-	-
Non-Project Works (Purchases, Hiring)	-	-	-	-	-
Total	-	-	-	-	-
Total	10,374,250,685.32	8,903,480,827.64	8,308,154,573.47	8,878,156,866.54	8,598,362,997.56

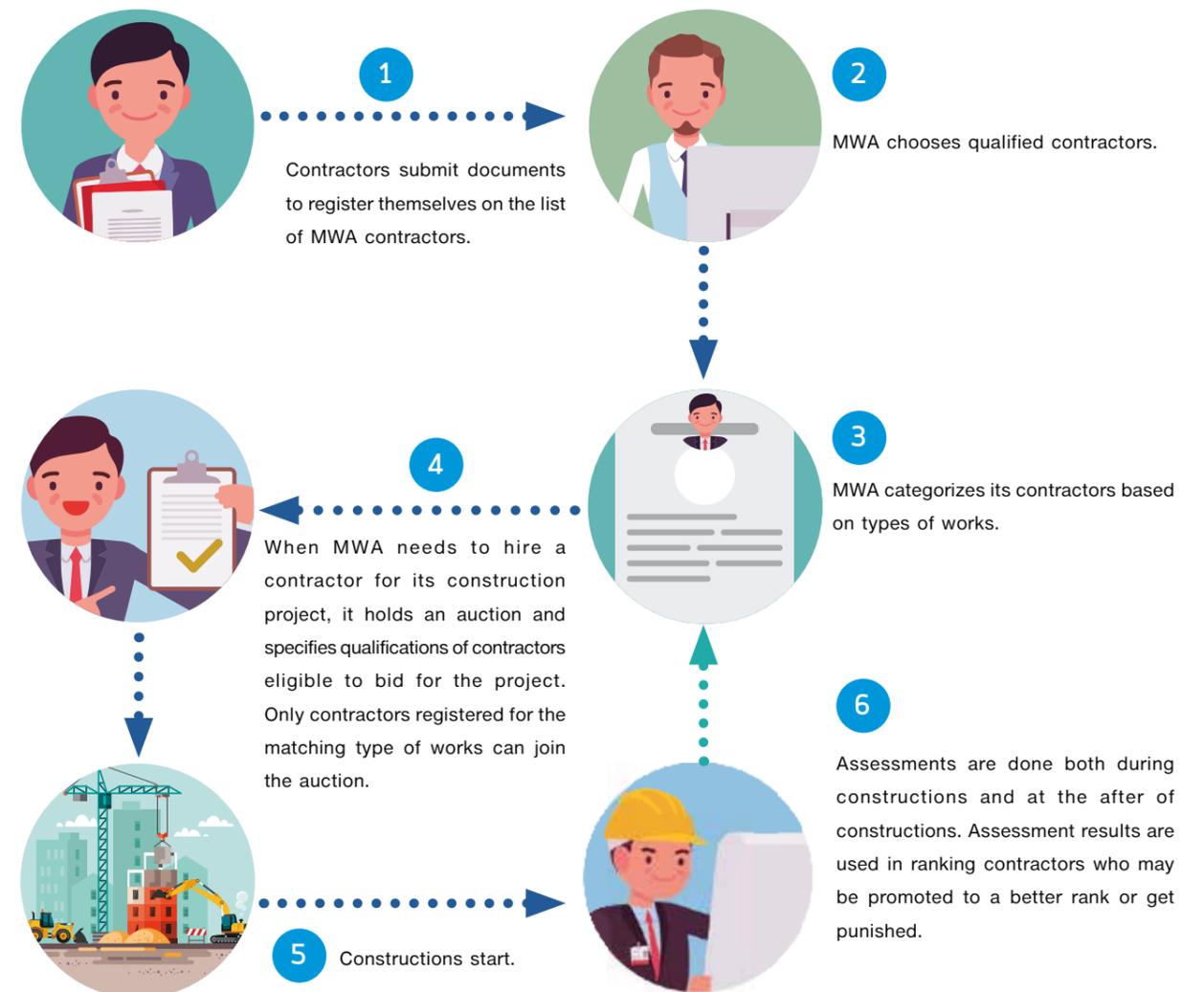
Data as of 24 December 2020



MWA Selection and Assessment of Contractors

MWA has set procurement standards with a clear process to select contractors based on criteria and regulations for the purposes to develop its organization in all aspects and uphold good governance.

According to the production and distribution of tap water, MWA needs to hire contractors who can complete relevant construction projects. Presently, the selection and assessment of contractors have thus been a key mission of MWA, which is done under the regulation on the registration and assessment of MWA contractors with an aim to ensure that contractors chosen have the potential to complete quality constructions within specified timeframe. The regulation facilitates quality control of projects and their fulfilment of objectives, which will in turn satisfy water users and provide an adequate supply of quality tap water for consumption without causing any negative impacts on communities and the society. MWA process to select and assess contractors features the following steps:



[At present, there are total of registered contractors in MWA system as shown on its website (www.mwa.co.th)]

Benefit of the selection and assessment of contractors

- 1 Ensuring MWA gets qualified contractors with expertise and efficiency to complete constructions stated in contracts within specified timeframe
- 2 Guaranteeing construction quality that meets MWA standard
- 3 Reducing complaints about traffic problems and construction delays



Types of works requiring contractors to register themselves with MWA

1

Trunk Main Constructions/Installations have 4 types of such works:

- 1.1 **Trenching and Installation:** This type involves trenching through soil surface, footpath or roads to lay down trunk mains;
- 1.2 **Pipe Jacking:** This type deploys technology in installing trunk mains without the need to trench along the whole pipeline stretch. The installation, with pipe jacking, needs digging only at certain spots where it is appropriate to drill in a hole underground and pushing in trunk mains.
- 1.3 **Horizontal Directional Drill (HDD):** This type installs new trunk mains by attaching a drilling device at their end and pulling them backward.
- 1.4 **Slip Lining:** This type connects new trunk mains as one piece before putting it on a pulley and inserting it into existing pipeline.



3

Civil Construction Works

4

Water Distribution Construction Works

5

Water Production Construction Works

6

Pumping Station and Water Tank Construction Works

Distribution Pipe Constructions/Installations have 4 types of such works:

- 2.1 Digging and Installation
- 2.2 Slip Lining
- 2.3 HDD (Horizontal Directional Drill)
- 2.4 **Cure-In-Place Pipe (CIPP):** This type features pipe improvements by inserting new pipes into existing old pipes with water or air pressure. Pipe lining is done and adjusted to appropriate positioning using pulling techniques, before it is cured with steam, hot water, or UV ray.

2



MWA Customers

MWA recategorized its customers based on water-usage behaviors and volume so as to have clearer segmentation and better respond to large customers' expectations and divided into 3 major groups:



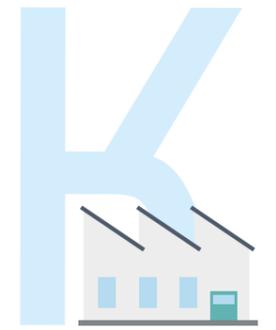
Residential

Group refers to customers using water for consumption within their household or residence. Most customers in this group mainly use water during certain hours of the days only. They usually use water in the morning and then in the evening and night hours. Each month, these users use less than 10,000 cubic meters of water each.



Non-Residential

Group refers to customers who use water all the time, such as organizations and enterprises. Customers in this group, however, still use less than 10,000 cubic meters of water each in a month on average.



Key Account

Group refers to customers who use more than 10,000 cubic meters per month of water each. With high expectations of MWA services, some of these customers use water only during specific periods of the day while others use water all the time.

In addition, there is the Key Account Group. Customers in this group use a high volume of water (10,000 cubic meters up per month on average). This group is designated for efficient Customer Relationship Management (CRM).

Number of Customers based on Behaviors and Needs in Fiscal Year 2020

Customer Groups	Residential (R)	Non-Residential (N)	Key Account (K)
Number of Customers (Person)	2,347,126 (96.86%)	73,444 (3.03%)	2,692 (0.11%)

Data as of 30 September 2020

Marketing Highlights

Water Sales (Unit: Million Cubic Meters)



Number of Water Users at the End of the Year



Number of New Water-Meter Installations (Unit: Person)



Population under Jurisdictions at the End of the Year (Unit: Person)



Number of Households under Jurisdictions at the End of the Year (Unit: House)



Product Highlights

Water Quality Physical Properties



2018	⇒ 100%
2019	⇒ 100%
2020	⇒ 99.97%

Water Quality Chemical Properties



2018	⇒ 100%
2019	⇒ 99.81%
2020	⇒ 98.82%

Water Quality Bacteria Properties



2018	⇒ 99.90%
2019	⇒ 99.97%
2020	⇒ 99.94%

Customer Service Highlights

(Quality) Water Quality



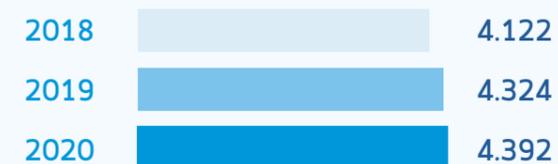
(Q1) No Abnormal Smell



(Q2) Water Clarity



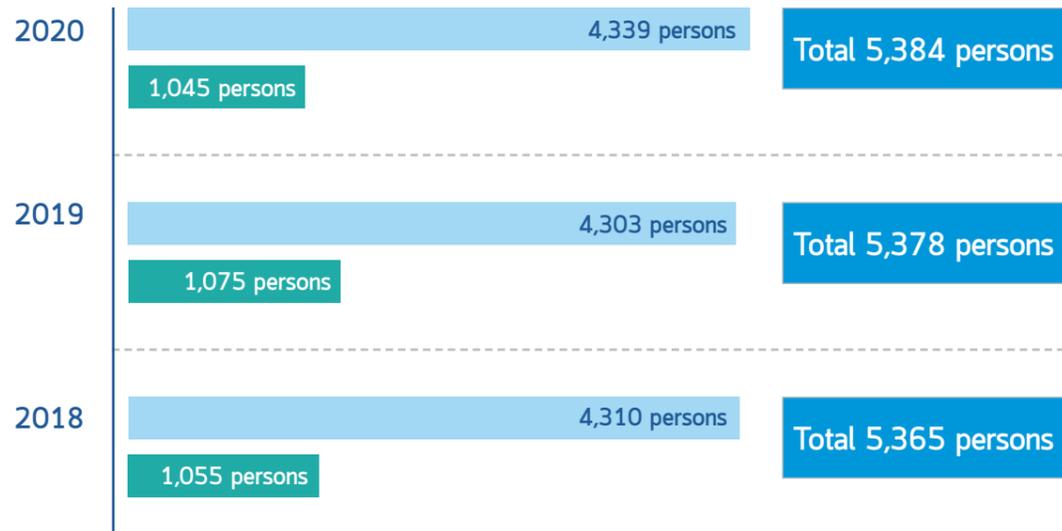
(Q3) Proper Water Pressure



(Q4) Constant Water Flow



Number of Employees and Subcontracted Workers



■ Employees
 ■ Subcontracted Workers



Notes:

- As of 30 September 2019
- Employees are employed under permanent contracts in line with the Metropolitan Waterworks Authority of B.E. 2510, the Standard Qualifications of Directors and State Enterprise Employees Act B.E. 2518, and the Standard Qualifications of Directors and State Enterprise Employees Act B.E. 2519.
- Subcontracted workers are employed under Temporary Contracts that the Metropolitan Waterworks Authority has made with subcontractors. There are 4 main groups of these workers:
 - Administrative group (Vocational Certificate/High Vocational Certificate) to handle administrative tasks, PR, audio visual equipment, supplies, accounting, accounting/finance, Call Center, and to serve as assistant scientists
 - Technician group (Vocational Certificate/High Vocational Certificate) to handle all technical tasks, production-system controls, and production-quality checks
 - Automotive group (compulsory education) to operate general vehicles, water-tank trucks, boats, and excavators
 - Other Task groups namely workers/pipe repairmen (compulsory education), and welders (no educational requirement)

MWA Organization Chart



Sustainability Policy



Rules, Regulations and Authority Governing MWA Framework for Economic, Social and Environmental Development

MWA, a state enterprise under the Ministry of Interior, was established under the Metropolitan Waterworks Authority of B.E. 2510 to carry out its missions in line with laws, regulations, and key

Laws/Rules/Regulations	Details of Applicable Laws and Regulations
 <p>Occupational Health and Safety</p>	<ul style="list-style-type: none"> The Occupational Safety, Health and Environment Act of B.E. 2554 The State Enterprise Labor Relations Act of B.E. 2543 The Ministerial Regulation on Standard of Occupational Health, Safety and Environment Management of B.E. 2549 The Ministerial Regulation on Employees' Health-Check Criteria/Method and Result Submission to Labor Inspectors of B.E. 2547 The State Enterprise Labor Relations Committee's Announcement on Minimum Employment Standard of B.E. 2549 The Labor Protection and Welfare Department's Announcement on Personal Protective Equipment Standard of B.E. 2554 The Labor Protection and Welfare Department's Announcement on Danger Signs, Occupational Safety, Health and Environment Signs, and Statement of Employers' and Employees' Duties and Rights of B.E. 2554 Labor Protection Act of B.E. 2541
 <p>Certification/Registration for Licenses to Operate</p>	<ul style="list-style-type: none"> The Metropolitan Waterworks Authority of B.E. 2510 Codes of Conduct The Good Governance Royal Decree of B.E. 2542 The World Health Organization (WHO) The Electronic Transactions Act of B.E. 2544 Electronic Transactions Act (Amendment Version) of B.E. 2562 Factory Act of B.E. 2535 Arms Control Act of B.E. 2530 Hazardous Substance Act (Version 3) of B.E. 2551 Public Administration and Services Delivery Act of B.E. 2562
 <p>Industrial Standards</p>	<ul style="list-style-type: none"> WHO's Guidelines for Drinking-water Quality, 4th Edition Incorporating the 1st Addendum Good Manufacturing Practice: GMP Hazard Analysis and Critical Control Points: HACCP ISO 9001:2015 on Quality Management System Standard ISO/IEC 17025:2005 on Testing and Calibration Laboratories Standard ISO/IEC 27001:2013 on Information Security Standard ISO/IEC 29110 on Systems and Software Engineering Standard ISO 26000 on Social Responsibility Standard Health Department's Announcement on Drinkable Tap Water Standard B.E. 2563, dated 13 July 2020 Health Department's Announcement on Drinkable Water Quality Criteria for Monitoring Purposes B.E. 2563, dated 13 July 2020 MWA Announcement on MWA Tap-Water Quality Criteria
 <p>Environmental, Financial and Product Management</p>	<ul style="list-style-type: none"> ISO 14001:2015 on Environmental Management System Standard The Budget Procedures Act of B.E. 2502 The Office of the Prime Minister's Regulation on State Enterprises Investment Budget of B.E. 2550 The Finance Ministry's Regulation on State Enterprises' Accounting and Finance of B.E. 2548 The State Fiscal and Financial Disciplines Act of B.E. 2561 WHO's Guidelines for Drinking-water Quality, 4th Edition Incorporating the 1st Addendum The Groundwater Act (No. 3) of B.E. 2546 The Licensing Facilitation Act of B.E. 2558 The Public-Private Partnership Act of B.E. 2562 The Government Procurement and Supplies Management Act of B.E. 2560 Enhancement and Conservation of National Environmental Quality Act B.E. 2535 Energy Conservation Promotion Act B.E. 2535 Ministerial Regulation on Criteria, Methods, Statistical and Data Forms, and Report on Wastewater Treatment System of B.E. 2555 Ministry of Natural Resources and Environment's Announcement on Water Discharge Standard for Industrial Plants, Industrial Estates, and Industrial Zones Ministry of Industry's Announcement on Industrial Plants' Water Discharge Standard of B.E. 2560 Ministry of Industry's Announcement on Waste Disposal of B.E. 2548
<p>Others</p>	<ul style="list-style-type: none"> Personal Data Protection Act of B.E. 2562 Cyber Security Maintenance Act of B.E. 2562

MWA Sustainable Development Policy

MWA is committed to act in line with sustainable-development principle, the Sufficiency Economy Philosophy, and Sustainable Development Goals (SDGs) that the United Nations has set for the world's development direction. Guided by the commitment, MWA has created assurances for its stakeholders by means of fair, transparent and responsible operations as well as constant innovation development as follows:



Item 1: Strict compliance with applicable laws and regulations, and respect for international guidelines



Item 2: Focus on social, economic and environmental balance, as well as on stakeholders across all sectors for MWA's sustainable growth



Item 3: Promoting the awareness of water resources' value among personnel and communicating the value to outsiders too



Item 4: Raising awareness of MWA's sustainable development among all groups of stakeholders, and promoting sustainable-practice guidelines to minimize any impact from MWA's value chain



Item 5: Promoting innovation and technological development for MWA operations on a continued basis, and equipping MWA personnel with adequate skills to keep pace with technological changes for the sustainable benefits of society and environment;



Item 6: Adherence to the principle of good corporate citizens, and using MWA's expertise for upgrading communities' quality of life for overall sustainability



Item 7: Transparent disclosure of MWA's policies, management guideline, operating results, and positive/negative economic, social and environmental impacts from operations on stakeholders so as to create understanding in MWA's direction and CSR for the goals of sustainable development.

All executives and staff of MWA have the duty to support, push for, and comply with MWA's sustainable development policy and the Manual on State Enterprise Development for Sustainability.

MWA Good Governance Policy

MWA is committed to conducting its operations in line with corporate-governance principle and international standards. MWA Board of Directors has accorded importance to good governance, transparent, accountable and corruption-free operations, and the focus on MWA transformation into a high-performance organization. To provide assurances to all groups of stakeholders on a sustainable basis, MWA has formulated its policy on good governance for its Board of Directors, governor, all other executives, and staff to uphold as follows:

- 1 MWA Board of Directors, governor, all other executives and staff shall work in strict compliance with corporate-governance principle, good-governance concepts, morality, ethics, applicable laws, regulations, rules, and ordinances;
- 2 MWA Board of Directors, governor, and all other executives shall have to set good examples of good governance, promote participation of all sectors within their organization, and carry out their duty with honesty, transparency and accountability. Also, they shall neither overlook nor ignore actions that may constitute corruption with serious punishments prescribed against those involved.
- 3 MWA Board of Directors, governor, and all other executives shall encourage stakeholders to join the formulation of measures, systems or guideline for monitoring/audits and to comment on MWA's work process or services;

- 4 MWA Board of Directors, governor, and all other executives shall formulate policies/guidelines that support fair competition with all groups of stakeholders treated transparently and equally;
- 5 MWA Board of Directors, governor, and all other executives shall ensure that MWA has appropriate and adequate risk-management system, internal control, and internal audits including the prevention of conflict of interest and monitoring of connected transactions;
- 6 MWA Board of Directors, governor, and all other executives shall prepare channels to receive complaints, feedback or tip-off about corruption, ethical violation, or unethical practice;
- 7 MWA Board of Directors, governor, and all other executives shall release financial and non-financial information based on international standard;
- 8 MWA Board of Directors, governor, all other executives, and staff shall work with social and environmental responsibility. Also, they shall support the development of innovations for balanced, secure and sustainable development; and
- 9 MWA Board of Directors, governor, and all other executives shall prepare supervisory, monitoring, audit, evaluation, and reporting systems; develop processes to ensure staff's strict and full compliance with MWA policy on good governance; and promote such compliance as a corporate culture on a sustainable basis.



MWA Stakeholder Engagement

Stakeholders and Sustainability Issues

Identification of MWA Stakeholders

In 2020, MWA reviewed its stakeholder identification based on the internationally-recognized Stakeholder Engagement Standard of AA1000:2015. Under review was its work process throughout its value chain. Following the review, MWA identified the followings as its nine stakeholder groups:



1. Policy-making authorities and shareholders from the government sector refer to authorities governing state enterprises such as Office of the National Economic and Social Development Council, Ministry of Interior, Ministry of Finance (State Enterprise Policy Office: SEPO), Budget Bureau of the Comptroller General's Department, the National Water Resources Committee (NWRC), National Anti-Corruption Commission (NACC), Office of Public Sector Anti-Corruption Commission (PACC), Office of the Auditor General of Thailand (etc.)



2. Relevant authorities with shared missions refer to government agencies with shared missions such as Royal Irrigation Department, Department of Water Resources, Department of Highways, Department of Rural Roads, Department of Public Works and Town & Country Planning, Bangkok Metropolitan Administrator, Wastewater Management Authority, Hydrographic Department etc.



3. Vendors refer to organizations, legal entities, or persons paid to provide products, services, personnel and lease contracts for MWA.



4. Partners refer to organizations or a group of persons agreeing to work with MWA in pursuit of shared goals. MWA partners are divided into two categories: business partners and academic partners.

Note: "Cooperation partners" in 2019 are now categorized as "Partners".



5. Customers

refer to water users in MWA's service areas namely Bangkok, Nonthaburi and Samut Prakan. Customers are divided into three groups as follows:

- **Residential (R)** Group refers to customers using water for consumption within their household or residence. Most customers in this group mainly use water during certain hours of the days only. They usually use water in the morning and then in the evening and night hours. Each month, these users use less than 10,000 cubic meters of water each.
- **Non-residential (N)** Group refers to customers who use water all the time, such as organizations and enterprises. Customers in this group, however, still use less than 10,000 cubic meters of water each in a month on average.
- **Key Account (K)** Group refers to customers who use more than 10,000 cubic meters per month of water each. With high expectations of MWA services, some of these customers use water only during specific periods of the day while others use water all the time.

6. Employees and Workers



- **Employees** refer to personnel working for MWA under permanent contracts and being supervised by MWA based on job description*;
- **Workers** refer to personnel working for MWA under temporary contracts and being supervised by MWA based on contract's terms. This group covers subcontracted workers and representatives*.
- **Subcontracted workers** refer to personnel being hired by MWA via contractors or vendors on the annual basis. There are four groups of subcontracted workers namely: 1) administrative group; 2) technician group; 3) automotive group; and 4) others such as general workers and welders**.
- **Representatives** refer to personnel hired by MWA to provide services on its behalf to water users based on its criteria and guidelines. Contracts for representative shall be renewed for three more years each time. Representatives of MWA are in three categories: 1) payment services; 2) wire binding; and 3) meter reading**.

Note: * Definition has been revised to reflect the scope of actual current operations.

** The definition of subcontracted workers and representatives have been added to increase clarity and to cover the scope of actual current operations.



7. Community and society

In 2020, important communities were defined as communities around (all four) water treatment plants of MWA. Criteria for important communities were proximity to operating areas, which means biggest risks of being affected by MWA operations, and potential to become stronger through MWA strengths.

Communities* mean

- 1) Headwater communities (east and west)
- 2) Communities along (western) water transmission canals from Kanchanaburi, to Ratchaburi, to Nakhon Pathom and to Nonthaburi (total distance: 107 kilometers) and communities along (eastern) water transmission canals in Pathum Thani (total distance: 30 kilometers)
- 3) Communities around (all 10) water-delivery pumping stations
- 4) Communities in service areas
- 5) Downstream communities along Mae Klong and Chao Phraya rivers

Society means a group of people who are not directly affected by MWA operations but whose quality of life will be raised by MWA.

Note: * Definition has been revised to increase clarity and to cover the scope of actual current operations.



8. **Media** mean media professionals and persons/groups of persons, legal entities or otherwise, who have worked in the field of mass media with duty to spread any type of information, messages, or content to the public via prints, radio, TV, digital media or any other media for the purpose of mass communications.



9. **Activists/independent agencies/civil society/academics** mean persons, groups of persons, or non-profit organizations that have presented their views to the society for the purposes of quality-of-life enhancement as well as social, economic and social development. Their presentation may affect the direction or operations of MWA.

Note: Changes have been made to comply with AA1000:2015 stakeholder identification guidance. Additional indicators cover persons/groups of persons whose viewpoints enable MWA to understand the situation/get new opportunities. Such stakeholder identification addresses a diverse perspective and covers stakeholders from all parts of the MWA value chain.

Comprehensive Identification of Stakeholders in MWA Value Chain



Stakeholder Mapping for Stakeholder Engagement

Stakeholder mapping is a part of the process to foster stakeholder engagement. Details are shown below:

Stakeholder Engagement Process

Identifying the Scope and Objectives of Stakeholder Engagement



Engagement Channels and Stakeholders' Expectations

Stakeholder	Communications/ Engagement	Frequency
Policy-Making Authorities and Shareholders from the Government Sector	<ul style="list-style-type: none"> Meetings Opinion-Gathering Forums Participation in MWA Activities Satisfaction Surveys 	<ul style="list-style-type: none"> At least twice a year Once a year At least twice a year Once a year
Relevant Authorities with Shared Missions	<ul style="list-style-type: none"> Meetings Participation in MWA Activities Satisfaction Surveys 	<ul style="list-style-type: none"> 2 - 4 times a month Throughout the year Once a year
Business Partners	<ul style="list-style-type: none"> Opinion-Gathering Forums Satisfaction Surveys 	<ul style="list-style-type: none"> Once a year Once a year
Allies		
Business Allies	<ul style="list-style-type: none"> Satisfaction Surveys 	<ul style="list-style-type: none"> Once a year

Stakeholders' Expectations*	Material Sustainability Topics Responsive to Stakeholders' Expectations**
<ul style="list-style-type: none"> Inclusive Waterworks Management 	<ul style="list-style-type: none"> Indirect economic impacts Policy involvement
<ul style="list-style-type: none"> Personal Data Protection Act (PDPA) 	<ul style="list-style-type: none"> Transparency and integrity
<ul style="list-style-type: none"> Waterworks-Crisis Management Plan 	<ul style="list-style-type: none"> Effluent and waster Policy involvement
<ul style="list-style-type: none"> Corporate Governance and Transparency (Corruption Risk Assessment) 	<ul style="list-style-type: none"> Transparency and integrity
<ul style="list-style-type: none"> Social and Environmental Responsibility in line with the 12th National Economic and Social Development Plan Part 4: National Development Strategy 	<ul style="list-style-type: none"> Local community Energy Emissions
<ul style="list-style-type: none"> Reduction of Complaints from Pipeline Installation/ Repair Areas 	<ul style="list-style-type: none"> Customer relationship management
<ul style="list-style-type: none"> Reduction of Inter-Agency Coordination Problems 	<ul style="list-style-type: none"> Partnership and collaboration
<ul style="list-style-type: none"> Government Data Integration and Joint Development of Smart Utility Application 	<ul style="list-style-type: none"> Innovation and digitalization
<ul style="list-style-type: none"> Quality Water Production and Crisis Procurement of Clean Water Reserve 	<ul style="list-style-type: none"> Effluent and waster Quality of tap water
<ul style="list-style-type: none"> Transparency 	<ul style="list-style-type: none"> Transparency and integrity
<ul style="list-style-type: none"> Development of Faster Procurement Process 	<ul style="list-style-type: none"> Supply chain management and sourcing
<ul style="list-style-type: none"> Increasing Communication/Information Channels 	<ul style="list-style-type: none"> Partnership and collaboration

Notes:

* Stakeholders' expectations are identified based on topics raised by all groups of stakeholders and the processing of feedback from stakeholders via various channels such as surveys and joint meetings. The expectations are also prioritized by process owners during their brainstorming workshops. Process owners have then formulated guidelines on how to interact properly with stakeholders for MWA's enhanced stakeholder engagement.

** Material sustainability topics responsive to stakeholders' expectations are identified based on information from brainstorming sessions, which were held to gather opinions from MWA's internal and external stakeholders. Moderators came from the Thammasat University's Puey Ungphakorn School Development Studies.

Stakeholder	Communications/ Engagement	Frequency
Academic Partners	<ul style="list-style-type: none"> MOUs with State Agencies / Research Institutes / Education Institutes / Companies on Research and Development for Waterworks and Related Fields Exchanges of Knowledge via Training, Seminars, Academic Conferences, Webinars, etc. Waterworks Profession Training for Local-Administrative-Body Personnel Project Announcement of Acceptance of Funding Proposals 	<ul style="list-style-type: none"> At least twice a year At least 3 times a year 2 times a year 2 times a year
Customers	<ul style="list-style-type: none"> Touch points such as MWA branches, Call Center 1125, CRM activities (MWA Meets People Project, Top-Tier), Service User Satisfaction Survey Project (Survey/In-depth Interview/ Focus Group) etc. Social Media such as Facebook/Twitter/Line@/ Social Monitoring etc. Mobile Application namely MWA onMobile 	<ul style="list-style-type: none"> Throughout the year
Employees and Workers	<ul style="list-style-type: none"> Meetings on MWA operating results that include Q&A session for staff Employee engagement survey 	<ul style="list-style-type: none"> 2 times a year Once a year

Stakeholders' Expectations*	Material Sustainability Topics Responsive to Stakeholders' Expectations**
<ul style="list-style-type: none"> Modern Technologies for Shared Use 	<ul style="list-style-type: none"> Innovation and digitalization
<ul style="list-style-type: none"> Open Innovation, for example in the forms of exchanges of knowledge, researches, and specialists 	<ul style="list-style-type: none"> Innovation and digitalization
<ul style="list-style-type: none"> Clear, clean and safe water, with public confidence in water quality (constant water flow and adequate water supply) Able to conduct all types of transactions and receive key information conveniently anytime, anywhere, without any need to physically travel to MWA branches. Important information that may affect water usage is also given. 	<ul style="list-style-type: none"> Quality of tap water Innovation and digitalization
<ul style="list-style-type: none"> Applying occupational-health and safety guideline to all MWA facilities 	<ul style="list-style-type: none"> Occupational health and safety
<ul style="list-style-type: none"> Transparent and fair formulation of promotion criteria 	<ul style="list-style-type: none"> Training and education
<ul style="list-style-type: none"> Welfare/Work life balance 	<ul style="list-style-type: none"> Training and education
<ul style="list-style-type: none"> Post-retirement care 	<ul style="list-style-type: none"> Training and education
<ul style="list-style-type: none"> Clear guideline and measures for dealing with emerging diseases 	<ul style="list-style-type: none"> Occupational health and safety

Stakeholder	Communications/ Engagement	Frequency
Community and Society	<ul style="list-style-type: none"> Opinion-Gathering Forums CSR Activities Satisfaction Surveys MWA Meets People Project 	<ul style="list-style-type: none"> Once a year At least twice a year Once a year 72 times a year (MWA has 18 branches, each holding four events a year)
Media	<ul style="list-style-type: none"> Press conferences on operating results Opening ceremonies for important activities Support for and Participation in Media Activities such as media organizations' anniversaries/events Media Interviews and Information Support for Media Social Media Exposure Press Releases Unofficial Media Visits (to each media outlet) Opinion Surveys 	<ul style="list-style-type: none"> Once a year At least 7 times a year Throughout the year Throughout the year Throughout the year Once a week Throughout the year Once a year
Activists/ Independent Agencies/ Civil Society/Academics	<ul style="list-style-type: none"> Social Media 	<ul style="list-style-type: none"> Throughout the year

Stakeholders' Expectations*	Material Sustainability Topics Responsive to Stakeholders' Expectations**
<ul style="list-style-type: none"> Safety of communities in water-treatment plants' neighborhoods 	<ul style="list-style-type: none"> Occupational health and safety Wastewater and effluents
<ul style="list-style-type: none"> Water quality and constant water flow 	<ul style="list-style-type: none"> Quality of tap water
<ul style="list-style-type: none"> Coordination with government agencies, local bodies, communities and the private sectors in affairs related to MWA 	<ul style="list-style-type: none"> Partnership and collaboration
<ul style="list-style-type: none"> Communications and promotion of understanding ahead of pipeline installations 	<ul style="list-style-type: none"> Innovation and digitalization
<ul style="list-style-type: none"> Creating jobs, opportunities for communities' sustainable self-reliance 	<ul style="list-style-type: none"> Local community
<ul style="list-style-type: none"> Support to fill what are lacking 	<ul style="list-style-type: none"> Indirect economic impacts Local community
<ul style="list-style-type: none"> Organizing activities for public benefits, with events or projects held in collaboration with neighboring communities 	<ul style="list-style-type: none"> Indirect economic impacts Local community
<ul style="list-style-type: none"> Fast and accurate information 	<ul style="list-style-type: none"> Innovation and digitalization
<ul style="list-style-type: none"> Reduction of Water Loss in Water-Production Process Proper Disposal of Sediments from Water-Production Process Accurate Data Disclosure including Water Purity and Quality Data 	<ul style="list-style-type: none"> Effluents and waster Effluents Innovation and digitalization Quality of tap water

Assessment Process of MWA Material Sustainability Issues

In Fiscal Year 2020, MWA reviewed its material sustainability issues to ensure they kept pace with the dynamically-changing economic, social and environment context. The changes, after all, may affect the operations, output and key services of MWA, as well as its stakeholders' expectations and needs.

Procedures for Assessment of MWA Material Sustainability Issues



1st Procedure: Identification of Material Issues

MWA identified its material sustainability issues based on the 5th MWA Corporate Plan, the Global Reporting Initiative (GRI) Standards, the United Nations' Sustainable Development Goals (SDGs), and findings from workshops that were held to comprehensively gather the opinions of stakeholder groups namely: 1) external stakeholders; 2) MWA employees; and 3) executives. The identification process reviewed whether MWA sustainability issues from the previous fiscal year remained relevant and whether new issues should be added.

2nd Procedure: Prioritization of Material Issues

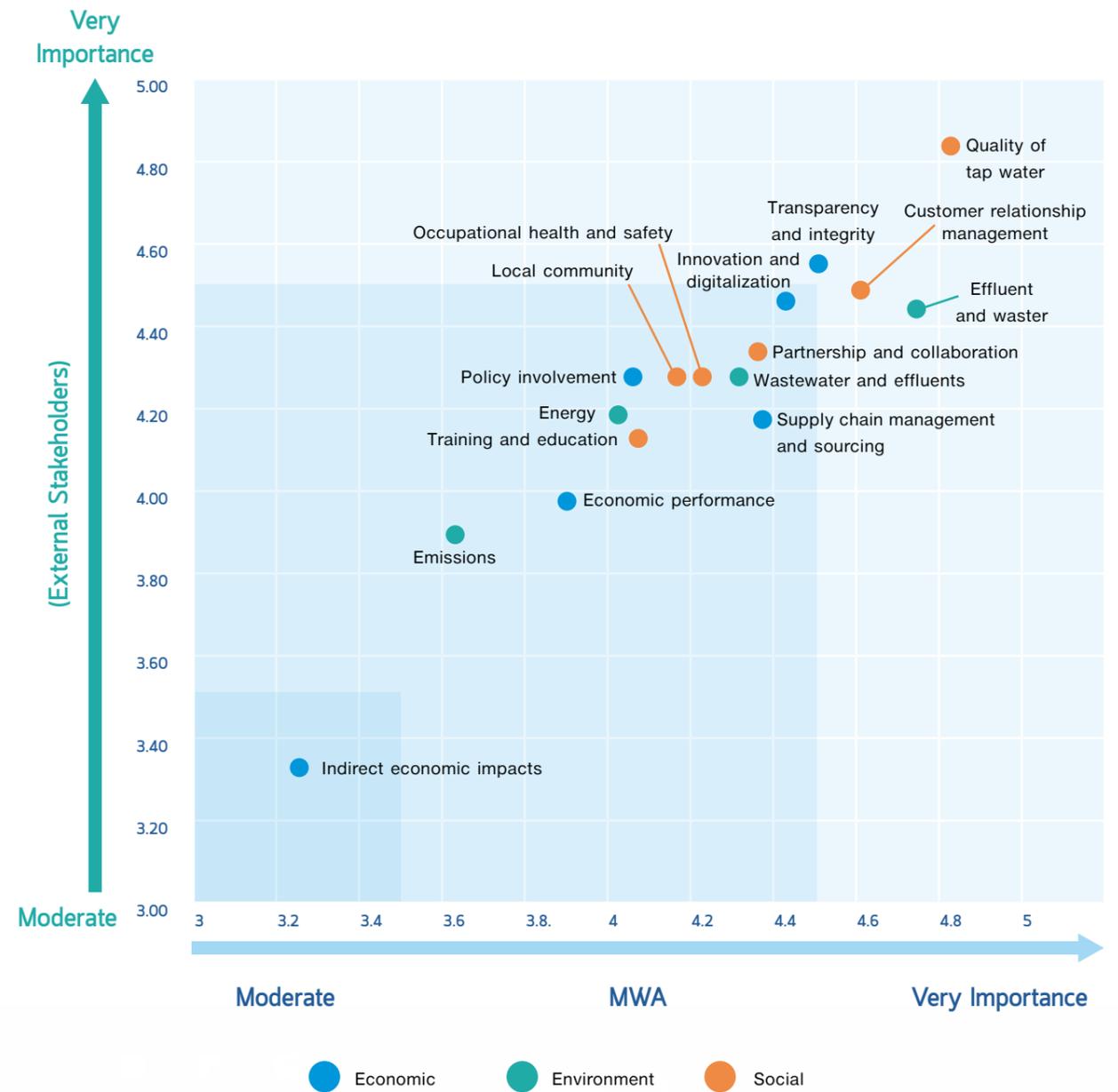
MWA prioritized material sustainability issues of Fiscal Year 2020 by reviewing the material issues from the previous years alongside external factors that might affect its business and stakeholders at a workshop so as to listen to the opinions of stakeholder groups. Two criteria for the prioritization are:

- 1) Importance level of issues to MWA operations
- 2) Importance level to stakeholders.

3rd Procedure: Validation of Material Issues

The panel in charge of preparing the MWA Sustainability Report reviewed the comprehensiveness of the identification and prioritization of material sustainability issues and presented the reviewed issues for the Subcommittee on Corporate Governance and Corporate Social Responsibility to consider and present to the MWA Board of Directors for acknowledgement.

Materiality Matrix of MWA Material Sustainability Issues 2020



Economic

- Transparency and Integrity^{GRI 102/GRI 205}
- Innovation and Digitalization^{NON GRI}
- Supply Chain Management and Sourcing^{GRI 204}
- Policy Involvement^{NON GRI}
- Economic Performance^{GRI 201}
- Indirect Economic Impacts^{GRI 203}



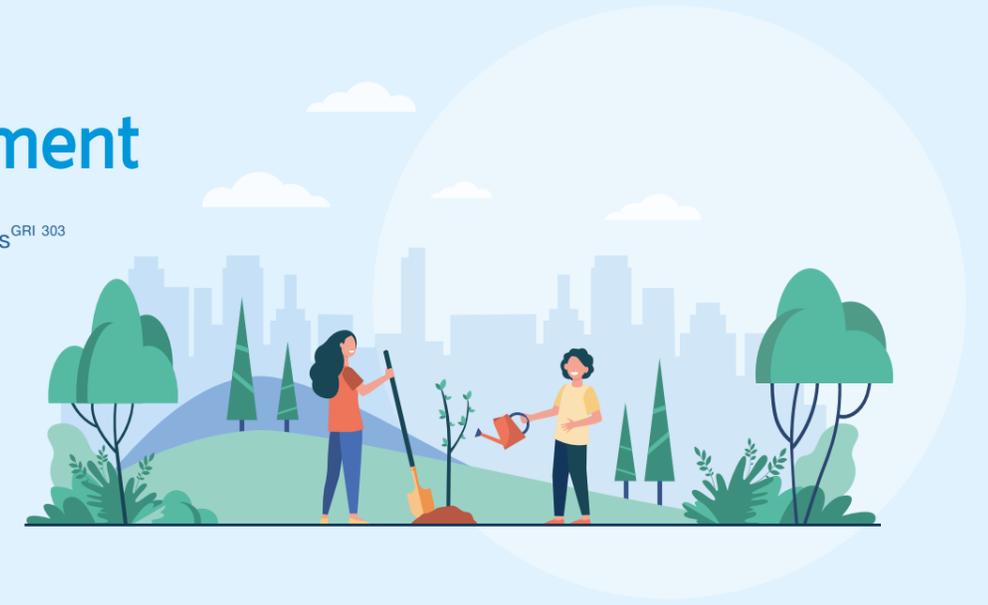
Social

- Quality of Tap Water^{GRI 416}
- Customer Relationship Management^{NON GRI}
- Partnership and Collaboration^{GRI 102 (disclosure 102-13)}
- Occupational Health and Safety^{GRI 403}
- Local Community^{GRI 413}
- Training and Education^{GRI 401/GRI 404}



Environment

- Water and Effluents^{GRI 303}
- Waste^{GRI 306}
- Energy^{GRI 302}
- Emissions^{GRI 305}



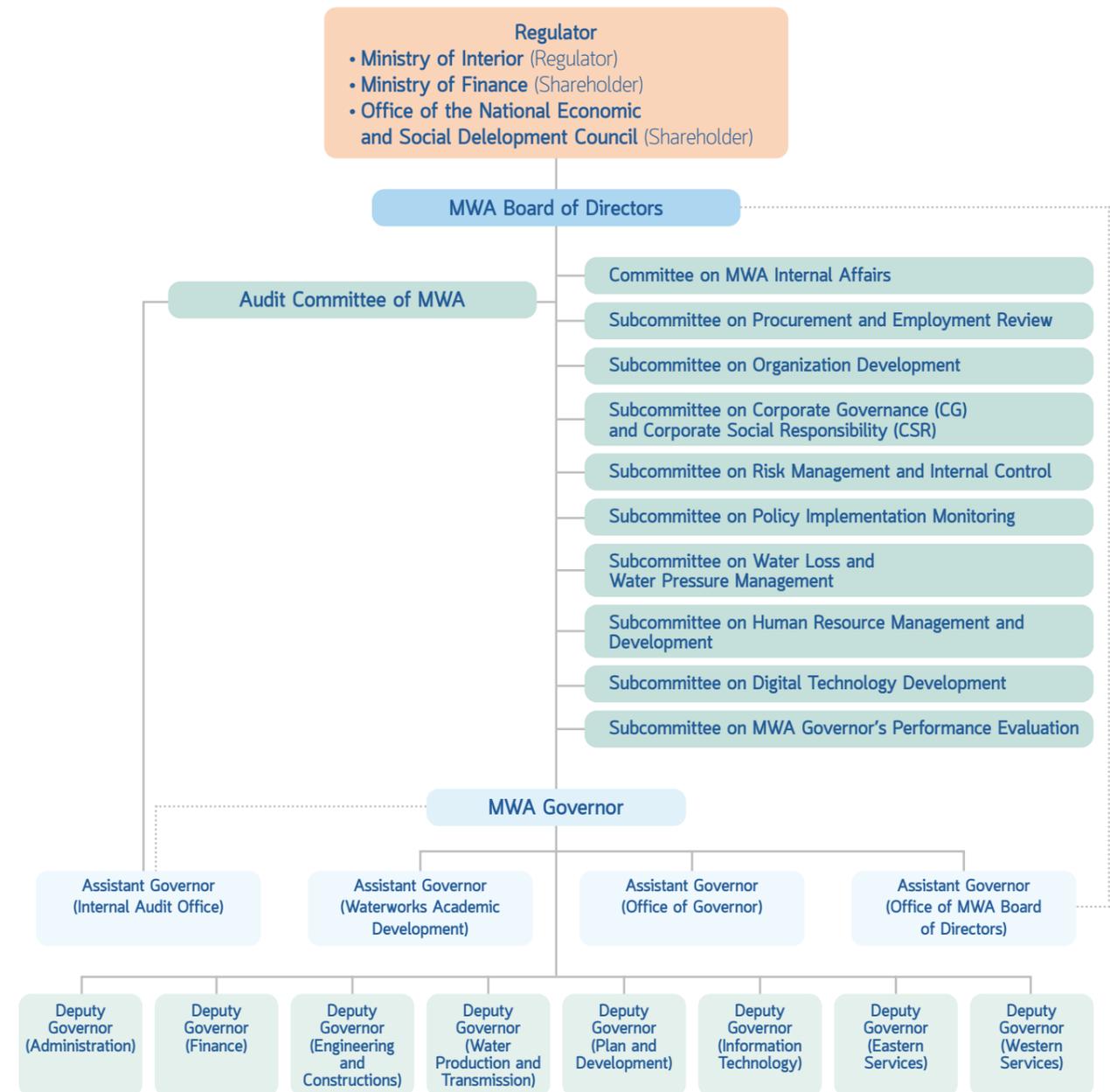
Economic Performance



Structure and Duties of MWA Board of Directors

MWA Board of Directors has accorded importance to good governance for sustainable value creation. It therefore has supervised and monitored the Management to ensure MWA operations efficiently meet the missions, objectives and targets of MWA, respond well to government policies, and demonstrate ethics, transparency, social responsibility, environmental responsibility and respect for all stakeholders.

MWA Good Governance Policy Chart



Structure of MWA Board of Directors is consisted of its chairman and other board members whose number must be at least 9 people but not more than 13 people, with the MWA governor being an ex-officio member. MWA Board of Directors has the power to set up committees/subcommittees to screen its works in social, economic and environmental aspects. Executives of MWA are also appointed as committee/subcommittee members or secretaries so that they can report MWA performance to committees/subcommittees. MWA Board of Directors is appointed by the Cabinet.

- They must have qualifications and possess no prohibited characteristics mentioned in the Metropolitan Waterworks Authority Act B.E. 2510, the Qualifications of State Enterprise Directors and Officials Act B.E. 2518, and other applicable laws. For example, they shall not be over 65 years of age. They shall have competence and experiences suitable for MWA operations. They shall have sufficient knowledge and proficiency in waterworks, engineering, economics, laws, political science and business administration.
- Chair and directors of the Board have a three-year tenure, except when they are appointed to replace others in the middle of the latter's term. In events of such replacements, they shall serve in the post for the remainder of their predecessors' tenure only. The tenure of the MWA governor shall be set by his/her employment contracts. Chair and directors of the Board who have already left the posts may be reappointed.
- Designed to match MWA missions and strategies, Skill Matrix for the selection and nomination of MWA Board of Directors is as follows:

Core Skills	Skills Required by MWA
 Finance	 Engineering (Civil Engineering/Water Sources/Environment/Sanitation)
 Accounting	 Business Administration/Economics
 Laws	 Human Resource Management
 Information Technology	 Organizational Management
	 Project Management
	 Innovations

- MWA Board of Directors includes the Ministry of Finance representative(s), who must be a civil servant based at the ministry and protect government interests as the ministry holds shares in MWA, a state enterprise.
- MWA Board of Directors includes a representative of the Ministry of Interior, who must be a civil servant not working in any agency that regulates MWA operations and integrate the ministry's policies to MWA.
- At least one-third of directors who are not ex-officio members of MWA Board of Directors must be chosen from the Ministry of Finance's of Director's Pool.
- At least one-third of directors who are not ex-officio members of MWA Board of Directors must be nominated on the based on of their specialized experiences in the business sector.
- At least one-third of directors who are not ex-officio members of MWA Board of Directors must be independent for compliance with the corporate governance principle for state enterprises.

MWA has evaluated the performance of its Board of Directors once a year in line with the state enterprises' good-governance principle, which requires that performance evaluations of state enterprises' boards of directors be carried out at least once a year so that board members can review their performance, relevant issues and obstacles for the goal of performance improvement. In fiscal year 2020, the MWA Board of Directors considered and approved two forms for its performance evaluation. One was for Self-Assessment and the other for Board Evaluation. The results from both forms were used to explore guideline for comprehensive improvement and to draw up action plan for the MWA Board of Directors.

The evaluation results of the MWA Board of Directors in fiscal year 2020 were as follows:

- 1 Self Assessment gave the average score of 4.83 out of 5. In other words, the score was as high as 96.55 out of 100 in comparison. Therefore, on average, individual performance by each director was considered excellent.
- 2 Board Evaluation gave the average score of 2.73 out of 3. In other words, MWA Board of Directors scored 90.99 out of possible 100. On average, the performance of the Board is considered excellent too.

training/seminars in programs that are useful to MWA's good governance and complement its strategies in a tangible manner on a continued basis. For example, it has arranged for its directors to attend the Director Certification Program (DCP) and the Certificate Course: Corporate Governance for Director and Senior Executive of State Enterprises and Public Organization (PDI). Its directors have also been provided with educational trips related to waterworks management systems or relevant systems. MWA has organized exclusive meetings for its independent directors too. Its directors, moreover, could actually visit MWA facilities to check on actual operations. For new directors, there is an Orientation Program to provide them with an overview of MWA operations. In addition, MWA has prepared a manual for its directors and provided them with key documents on MWA as well as other essential information so that they could perform their duties with utmost effectiveness and efficiency (disclosure 102-27).

MWA considered the key missions of its Board of Directors, the evaluation scope of state enterprises' performance on good governance and leadership that was based on the system launched in fiscal year 2020, and the areas in which its Board of Directors still got low scores for the analysis and formulation of the plan to improve MWA Board of Directors' good governance efficiency in fiscal year 2021.

MWA has the policy to support all its directors in knowledge/skill enhancement in the forms of



Role of MWA Board of Directors

Formation of MWA Direction:

MWA Board of Directors joins the Management in the formulation of MWA vision, missions, strategies, and targets. It also has the duty to approve MWA State Enterprise Plan, annual action plans and budgets or their revisions. MWA Board of Directors, moreover, provides observations and recommendations so as to provide a clear operational framework for MWA. It has also assigned the Management to communicate policies/targets to employees at all levels and to ensure operations are in line with the aforementioned plans.

Organizational Management System:

It supervises/monitors MWA to ensure its organizational management is adequate and appropriate. Key components of the organizational management system are:

- 1) Internal Audit System
- 2) Information and Digital Management System
- 3) Human Resource Management System
- 4) Risk Management and Internal Control System

MWA Board of Directors considers and approves the annual action plan on key organizational-management systems ahead of the start of the new fiscal year, monitors implementations at least on a quarterly basis, and provides observations/recommendations so as to uphold the systems' standards and ensure their adequacy.

Formation of MWA Policies:

MWA Board of Directors formulates MWA policies and ensures MWA's compliance with applicable laws, regulations, and policies.

Promotion of Good Governance:

MWA Board of Directors ensures corporate-governance policy is in place together with MWA Good governance Manual and long-term corporate-governance plan. Also, MWA Board of Directors considers and approves annual work plan ahead of the start of the new fiscal year.

Response to Government:

MWA Board of Directors reports the results of MWA implementations of policy and guideline on good governance to the Ministry of Interior, which supervises MWA, and to the Ministry of Finance, which is its shareholder. Reports are comprehensive and complete. Prepared systematically, these reports cover all material topics and present both financial and non-financial operating results. There are reports on corporate-governance and compliance with applicable laws, regulations and ordinances too.

Role in Fair Market:

MWA Board of Directors ensures that MWA prepares policies/guideline on fair competition. Comprehensive and systematic, the guideline governs MWA responsibility for competitors/creditors, promotion of fair competition, and financial management that seeks to find funding sources transparently and fairly. Also, the guideline requires that financial and accounting practices to be in line with generally-accepted standards. Complaint-receiving channels are designated with remedial actions prepared. MWA Board of Directors also ensures that MWA combats corruption/bribery, arrange fair procurements, and does not discriminate against any vendor/supplier.

Shareholders' Rights Management:

MWA Board of Directors ensures that MWA has policy/guideline on shareholders' rights management that comprehensively addresses key topics namely the prevention of conflict of interest, connected transactions, and the use of inside information.

Role towards Stakeholders:

MWA Board of Directors ensures that MWA has policy, manual, plans, long-term master plan, and annual action plans on its responsibility for stakeholders, society and the environment. Also, MWA Board of Directors considers and approves long-term and annual action plan on responsibility for stakeholders, society and the environment. It follows up with the results of the implementations at least once every quarter.

Innovations and Sustainability:

MWA Board of Directors ensures that MWA has policy and manual on innovations. Also, it considers and approves long-term and annual action plan on innovations ahead of the start of the new fiscal year. It, moreover, ensures MWA has policy, manual and report on sustainability.

Data Disclosure:

MWA Board of Directors ensures that MWA discloses financial and non-financial data/information via its annual report and website. In fiscal year 2020, MWA established the MWA Data Governance Council and tasked it with the missions of studying, planning, and formulating the scope of MWA data governance. The council is also responsible for controlling, monitoring and supervising various MWA units and employees to ensure compliance with MWA data governance.

Monitoring of Operating Results:

MWA Board of Directors monitors MWA financial and non-financial operating results through its meetings every month. It also provides observations and recommendations so as to ensure effectiveness, efficiency, and fulfilment of targets.

Work related to top executives, senior executives, and employees

- 1) Establishing the MWA Governor Selection Committee and tasking it with the mission of reviewing selection criteria and methods so as to select a qualified person for the post of MWA governor;
- 2) Ensuring that MWA governor appropriately prepares the structure of senior executives, lays down their clear work scope, and specify their qualifications;
- 3) Ensuring that MWA has succession plans for the posts of its governor/senior executives as well as other key positions;
- 4) Encouraging and supporting executives/employees in regard to training/development for additional knowledge/experiences that are useful to their work;
- 5) Ensuring that the performance of MWA governor/senior executives be evaluated based on criteria, indicators, weighting and targets that have been clearly set early in the year every six months, and integrating evaluation results to motivational system;
- 6) Ensuring that MWA governor manages human resources in line with MWA missions/objectives and retains talents.

Establishments of Committees and Subcommittees

The establishments of committees and subcommittees are made to supervise and screen agendas that will be submitted before MWA Board of Governors. The chairman of the Board should not serve as the chair or a member of such committees/subcommittees to ensure their independence.



QR Code: Role and Duty of MWA Subcommittees
<https://www.mwa.co.th/download/anticor/01-2563.pdf>

Remuneration for MWA Board of Directors



MWA, a state enterprise under the Ministry of Interior's supervision, has provided remuneration to its Board of Directors based on criteria approved by the Cabinet. The payment of remuneration to the MWA Board of Directors is made only to active directors. There is no remuneration for former directors who have already retired/left the Board. Directors receive monthly remuneration of Bt10,000 on average. The amount of payment is proportionate to the duration of their term. The chair of the MWA Board of Directors receives double the amount or Bt20,000 per month on average.

Regarding meeting allowances, MWA pays them in line with criteria on the payment of monthly remuneration and meeting allowances for state enterprises' directors and members of their committees, subcommittees and other work panels pursuant to the Cabinet resolution dated 24 April 2019. The maximum meeting allowances per month is Bt20,000. The remuneration for the chairs of the meetings is 25 percent higher than that of other meeting participants.

- 1) For MWA Board of Directors meetings, MWA pays meeting allowances once a month. However, it may pay allowances for up to 15 times a year in events there are reasonable grounds to do so.

- 2) For the meetings of committees, subcommittees or any work panels established pursuant to laws, regulations, the resolutions of the Cabinet or its Board of Directors, MWA pays meeting allowances to meeting participants at the rate of 0.5 times the meeting allowances for directors. Each month, MWA shall pay meeting allowances for no more than 2 committees, subcommittees or work panels and just once per committee, subcommittee or work panel.

MWA pays a bonus to its directors after it submitted a portion of its profit to the Ministry of Finance as state revenue. Bonus amount is calculated based on directors' performance evaluation and the budget approved based on criteria set by the Cabinet resolution dated 2 July 2013. In this resolution, the Cabinet approved the improvement of performance-based financial incentive system for state enterprises that was proposed based on the result of the State Enterprise Policy Office's Board of Directors meeting No. 4/2556 on 17 June 2013.

Organizational Management

Risk Management

MWA has recognized the importance of efficient risk management, which enables its organization to achieve its goals and targets and also to reduce losses that could happen. At MWA, risk management has been conducted completely in line with the internationally-recognized COSO-ERM (The Committee of Sponsoring Organizations of the Treadway Commission's ERM (Enterprise Risk Management) standard. MWA has implemented integrated risk management at all levels from the Subcommittee on Risk Management to operational-level staff. The risk management process starts with the review of internal and external risk factors. After risk identification, risk-management plans have been drawn up in a systematic manner with monitoring well in place to keep risks at manageable level and to ensure timely response. MWA has made risk management a part of its corporate culture as follows:

Raw-Water Quantity & Quality



Although MWA faced drought and salinity intrusion in 2020, its emphasis on raw-water quantity and quality did not waver. To tackle the problems, it set up the Water Crisis Administration Center to monitor the situation, constantly check the quality of water in relevant rivers, and coordinate with relevant authorities. Measures were prepared to deal with possible impacts if salinity reached MWA raw-water intake points on the eastern side of the Chao Phraya River. Moreover, MWA closely monitored Key Risk Indicators (KRIs) related to raw-water quantity and quality, enabling executives to get timely information for raw-water quality monitoring and management.

Stability of Production System, Transmission System, and Delivery System



MWA has planned to raise the stability of its water production system, transmission system, and delivery system during dry season in the short run, in the medium run, and in the long run. It has also intended to invest in the 9th waterwork improvement master plan with aim to uphold the sustainability and stability of raw-water system, water production system, and water-delivery system and to deal with whatever situation that may arise. Moreover, MWA has drawn up Business Continuity Plan (BCP) for its key work processes. The BCP covers all the processes from raw-water system to service system. MWA has conducted drills for its emergency response plans and the BCP in collaboration with all relevant units, internal and external, as assurance that it will be able to serve water users without any interruption.

Commitment to Stakeholders



MWA has accorded importance to all stakeholders around its water treatment plants. Thus, it has conducted activities to educate them about tap-water production and related chemicals for them, as well as emergency drills with them so as to ensure preparedness to emergencies. In addition, MWA has improved infrastructure and equipment at all three chemical-dispensing buildings of its water treatment plants. The improvement provides greater safety to staff as well as stakeholders around the plants.



Finance

To ensure budget reimbursement proceeds in line with targets, MWA has controlled risks related to reimbursement in every step of its work processes. It has assigned its work units to make advance preparations for procurement process, review the need of budget usage to best respond to actual operations, improve procurement process, set standard prices, draw up proper terms of reference (TOR), and select specialized contractors for successful project implementations, and to drive the Thai economy on the overall.

Information Technology

To ensure IT system is secure and stable at all times, MWA has reviewed and improved IT Continuity Plan. It has also conducted drills in line with ISO27001:2013 standard, which specifies procedures that must be taken in events a server goes down or an emergency happens. The drills are designed to ensure staff have skills and ability to implement the prescribed measures in full for business continuity. During COVID-19 outbreak, MWA has prepared adequate video-conferencing systems for its personnel who need to work from home. The systems are backed by IT security measures to thwart hacking and cyberattacks, which according to reports across the globe, have received attention from all leading organizations.



Efficiency Enhancement and Water-Loss Reduction

MWA is committed to adequately producing tap water for comprehensive consumption while well aware of the importance of efficient water usage. MWA therefore has curbed water loss further by means of improving more of worn-out water pipes, increasing surveys on leaking water-delivery pipes, hiring personnel to cut water loss on area-based basis, ensuring there is adequate personnel for each area, and raising the supervision efficiency for water-delivery pipeline construction and repairing to minimize the problem of pipeline leak/damages in the future and also to efficiently boost the sustainability of water-delivery pipeline system on the overall.



Internal Control

MWA is aware that internal control is a mechanism for Corporate Governance and contributes to the 5th MWA Corporate Plan (2020 - 2022). As a result, it has used internal control as its development and management tools on a continued basis. MWA's internal control has complied with the Ministry of Finance's Internal Control Standard and Guideline B.E. 2561 (2018) as well as the internationally-recognized Committee of Sponsoring of the Treadway Commission: COSO 2013 standard.

In 2020, MWA carried out the following activities for its efficient internal-control development and sustainable-development promotion:

Fostering Corporate Culture for Risk Management and Internal Control

As fast-changing circumstances have brought forward several challenges, MWA has recognized the importance of promoting risk management and internal control culture among personnel at all levels. To foster such corporate culture, MWA has continuously conducted the Risk Management and Internal Control Roadshow, quizzes for prizes, photo contests, and training on risk management and internal control for both executives and staff. Such corporate culture not only raises MWA's risk-management and internal-control standards but it also enables MWA to fulfil its goals.



Integration of Internal Control into Key Work Processes

MWA aims to improve its internal-control process by integrating internal control into its organization in a systematic and continuous manner. All its units are instructed to set up their internal-control system. They also have to conduct control self-assessment (CSA) by taking into account their mission, key work processes, requirements, process, control points, indicators, and targets so as to ensure internal control meets targets and moves towards integration and knowledge management that comprehensively addresses all critical points. MWA promotes response to risks related to work environment, water users' needs, changing digital technologies, and Thailand 4.0 policy, which requires innovation-driven organizations, for the goal of operating with efficiency, transparency, and accountability.



Internal Audit

Internal audit by the Audit Office provides both assurance and consulting services fairly and independently under the supervision of the Audit Committee in support of MWA's fulfilment of its corporate objectives. The role and responsibilities of the Audit Office are clearly specified in the Audit Office Charter, which has been reviewed every year to comply with applicable rules, regulations, standards and criteria. Internal auditor shall treat all audited units as customers, offering useful recommendations for solutions that facilitates the fulfilment of objectives. Internal audits are expected to be creative, embrace teamwork, and apply data analytics as well as computer assisted audit techniques (CAATs) for efficiency.

Internal Audit Practice and Reporting

The Long-Term Audit Plan (Fiscal Years 2017 - 2021) and the Audit Plan for Fiscal Year 2020 prescribed risk-based audits. The focus is on key risk factors of MWA, resonates with the 5th MWA Corporate Plan (2020 - 2022), and addresses the expectations of the Audit Committee, the State Audit Office, and MWA's high-level executives. Audit Universe (AU) covers all aspects of operations, with audit results sent to the audited units' executives for use in improving their operations. Response to the recommendations is monitored. The MWA governor, the Audit Committee, and the MWA Board of Directors have received audit reports on a quarterly basis. Both executives and audited units can get counseling services so that they can improve the efficiency of MWA's internal control, risk management and corporate governance. MWA has also joined the State Enterprise Support Project on Organizational Development (Mentor) for the purposes of fostering bilateral ties and strengthening state enterprises that drive Thailand's economic and social development.

Maintaining the Quality of Internal Audit

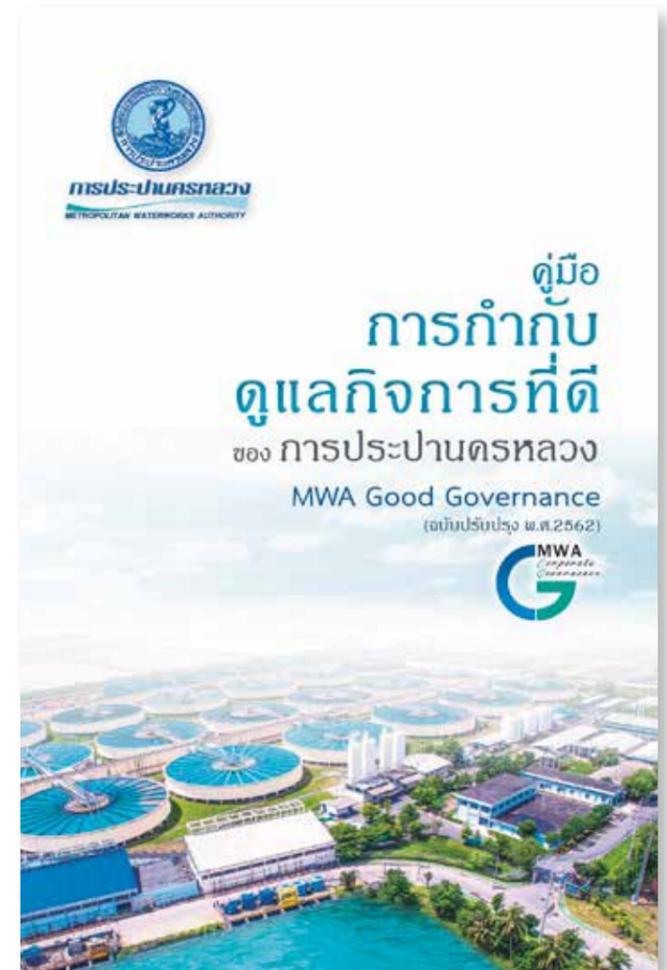
Internal auditors have worked in line with the Internal Audit Manual, which has been reviewed every year to ensure it remains relevant to MWA's changing context. Quality of internal audit has been checked through the line of command. On top of self-assessments, the Audit Committee and high-level executives are responsible for assessing the performance of the Audit Office. Satisfaction surveys are also conducted among audited units after they were audited. In addition, independent external specialists have conducted assessments of MWA's internal audits at least once every five years. Findings from assessments and surveys have been used to improve internal audits and prepare appropriate training courses for internal auditors so as to enrich their skills and capabilities. Besides, MWA encouraged and provided related support for internal auditors to improve their skills and seek certifications/licenses for auditors and related professions in Fiscal Year 2020 by launching the internal-auditor development project with aim to ensure MWA internal auditors earn internationally-recognized certificates as certified internal auditors (CIA) or certified information systems auditors (CISA).

Audit fee: The State Audit Office has audited MWA's financial statements for Year 2020. Audit fee is 2.50 million baht.

Transparency and Integrity

Good Governance

MWA Board of Directors has the policy to apply the corporate-governance principle to its good governance. It has therefore issued MWA Good Governance Policy since 2006 in line with the principle/guidance on state enterprises'/ listed companies' good governance in pursuit of its goal to become a "high-performance water supply organization with excellent corporate governance and world-class standard". Consistent with the aforementioned principle and guidance, MWA Good Governance Manual is in place to ensure MWA is transparent, accountable and free from corruption. The manual has already been revised in line with the 5th MWA State Enterprise Plan (2020 - 2022), which has been updated to resonate with the 20-year national strategy (2018 - 2037), the 12th National Economic and Social Development Plan (2017 - 2021), the national strategy on anti-corruption Phase 3 (2017 - 2021), the Ministry of Interior's Strategic Plan (2017 - 2021), and government policies on good governance for state administration and prevention of corruption/abuse of authority in public sector for the goal of ensuring that the manual's content is appropriate, suitable to current context, and more in line with international standard as prescribed by the United Nations Convention Against Corruption 2003. Presently, MWA has already included its policies on good governance and anti-corruption in its manual.



MWA has adopted the manual as the guideline for its Board of Directors, subcommittees, executives, and employees. The Subcommittee on Corporate Governance (CG) and Corporate Social Responsibility (CSR) has approved the revised manual, while MWA Board of Directors has already acknowledged the revision.



QR Code: MWA Good Governance Manual
https://www.mwa.co.th/main.php?filename=cg_policy

Metropolitan Waterworks Authority's Operational Ethics

MWA has formulated a guideline on good behaviors and compliance with applicable codes, rules and regulations for standard practice at work in support of its good image and international recognition. Directors, members of committees/subcommittees, executives and staff at all levels of MWA must comply with the guideline. Below are the components of the MWA ethical and moral framework:



Section 279 of the Thai Constitution B.E. 2550 prescribes codes of ethics to persons holding political positions, civil servants or state officials, and also mechanisms and systems to efficiently enforce compliance with the codes. The charter specifies punishments, which shall be meted out according to the severity of violations. In line with the intention of the aforementioned constitutional stipulation, MWA Board of Directors prepares the MWA Code of Operational Ethics pursuant to the MWA Regulation No. 133 on Code of Ethics for MWA Governor and Staff B.E. 2552 that was announced on 28 December 2009. This ethical code has been released for all to acknowledge.

MWA Principle of Corporate Governance

MWA has accorded importance to corporate governance by laying down management and operational guidelines for the purposes of being a high-performance organization and giving assurances to all groups of stakeholders on a sustainable basis. The guidelines feature 6 components as follows:



1. The Rule of Law

which refers to equally enforcing fair rules and regulations to all and preventing any abuse of authority



2. Virtue

which refers to adherence to righteousness at work and setting good examples for the society by discouraging corruption and joining forces in suppressing graft



3. Transparency

which refers to transparent and accountable management with straightforward disclosure of useful data



4. Participation

which gives opportunities for employees to take part in management, decision-making or recommendation processes



5. Accountability

which promotes awareness of one's duties, rights and responsibility for one's actions at work



6. Efficiency & Effectiveness

which refer to efficient and effective management of existing resources for maximum benefits of all

MWA Corporate Governance Performance

- MWA Board of Directors has issued key policies for Good Governance and Corporate Social & Environment Responsibility (CSR). It has also assigned the Subcommittee on Corporate Governance (CG) and Corporate Social Responsibility (CSR) to formulate strategies, goals, and work plans in support of good governance, social responsibility and fair treatment of all groups of stakeholders;
- MWA is committed to and recognizes the importance of tangible corruption prevention. For instance, its Board of Directors and high-level executives from the rank of division managers up have joined the declaration of the "Metropolitan Waterworks Authority is transparent, accountable and corruption-free" so as to highlight their commitment to honest and accountable management. In addition, MWA has issued policies on good governance and the giving/receiving of gifts or any other benefit B.E. 2562. It has established the

MWA Corporate Governance Council too with aim to engage its personnel in protecting their organization's interests and boosting their organization's immunity against internal and external interference. Furthermore, MWA has set up MWA Anti-Corruption Operation Center to conduct operations against graft and abuse of authority in line with national strategies, and also to respond to government policies on good governance for the purpose of connecting with relevant networks so as to drive anti-corruption policies and measures. MWA Anti-Corruption Operation Center, for example, has now collaborated with the Ministry of Interior's Anti-Corruption Operation Center. Presently, MWA Anti-Corruption Operation Center is based at the Corporate Governance Division on the 6th floor of the MWA headquarters building. It has accepted complaints about corruption and abuse of authority via telephones, facsimile, Internet, Intranet and QR Code, etc.

Transparency Awards in Fiscal Year 2020



Asia Responsible Enterprise Awards (AREA) 2020 in Corporate Governance Award from the Doing Good with Good Governance Heart project, which was organized by Enterprise Asia that seeks to advance social causes and empower enterprises in Asia



12th Integrity and Transparency Scores of all 53 enterprises in the country by the Integrity and Transparency Assessment (ITA), conducted by the NACC, covers 8,302 state organizations in fiscal year 2020.

Anti-Corruption

MWA has accorded importance to the promotion of integrity, morality, ethics, and anti-corruption. Such promotion has thus been integrated into the 5th MWA State Enterprise Plan (2020 - 2022)'s Area 3: Promotion of Good Relationship with Stakeholders and Adherence to Good Governance for Sustainability. It is also related to Strategy Objective 5 or SO-5: Building and Enhancing good relationship and cooperation with stakeholders based on good governance and Strategy 3.2: Upgrading relationships with stakeholders through corporate governance in pursuit of sustainability. Moreover, the promotion of integrity, morality, ethics, and anti-corruption is integrated into MWA action plan for fiscal year 2020.

In addition, MWA has issued anti-corruption policy for its Board of Directors, subcommittees,

executives, employees or workers to comply with. Also MWA has formulated the relevant policies such as policy on integrity and transparency, announcement on gift/benefit-giving and receipt B.E. 2563, and policies on corruption tip-off, anti-corruption, and protection of tipsters.

MWA Board of Directors, subcommittees, executives and all employees have signed a declaration every year to reaffirm their pledge to manage/carry out works with honesty toward the public and all groups of stakeholders. For fiscal year 2020, MWA set the target of scoring more than 90 points in the integrity and transparency assessment (ITA) of state organizations or ranking among the top eight state enterprises in the ITA. **Results showed MWA scored 92.21 or got Grade A.**



MWA's Anti-Corruption Declaration
<https://www.mwa.co.th/download/anticor/thai64.pdf>

Corporate Governance Council

MWA is the first state enterprise to have established the "Corporate Governance Council" to promote corporate value and culture that foster morality and ethics. Developed based on the CG My Idol project, MWA Corporate Governance Council is expected to serve as a mechanism against corruption. Set up under the MWA Regulation No. 138 on the MWA Corporate Governance Council B.E. 2559, the council has a total of 101 elected members. Council members are voted in from various units of MWA. This council is in charge of corporate-governance communications. It has listened to the voice of MWA staff, their problems, and their opinions before communicating them to MWA executives in its bid to create corporate governance in a tangible manner. MWA Corporate Governance Council has been in operation for four consecutive years now.



In fiscal year 2019, MWA Anti-Corruption Operation Center received 1 complaint. The unit at the center of the complaint is in the process of resolving the issue. (disclosure 102-34)

Corruption Risk Assessment Process

In 2017, MWA signed Thailand's Public Sector Collective Action Coalition Against Corruption: Year of Permit Facilitation and Anti-Bribery with the Office of Public Sector Anti-Corruption Commission (PACC). Since the signing, MWA assessed its corruption risks on a yearly basis. In fiscal year 2020, MWA took the following actions:

- 1) It organized workshops on the assessments of its internal corruption risks for 120 executives from the rank of department directors or equivalent. After attending the workshops, the participants' knowledge and understanding of the topics reached 95.67 percent;
- 2) It drew up the internal corruption risk management plan under the topic of "replacements of meter/equipment in the process of meter/equipment withdrawal" of the Eastern Services Line and the Western Services Line. The plan has received approval from the MWA Committee on Anti-Corruption and Moral Promotion;

- 3) MWA branches complied with the internal corruption risk management plan; and
- 4) MWA reported the results of the plan implementation to MWA Committee on Anti-Corruption and Moral Promotion, which will forward them to PACC.

Internal Corruption Risk Management Plans in Fiscal Years 2018 - 2020 (Eastern Services Line and the Western Services Line)

- | | | |
|------|---|--|
| 2018 | Requests for water-meter installations | |
| 2019 | Supplies withdrawal process (withdrawal of equipment/pipes) | |
| 2020 | Replacement of meter/equipment in the process of meter/equipment withdrawal | |

Participation in Anti-Corruption Network/Project

MWA has joined anti-corruption networks alongside external organizations such as the Foundation for a Clean and Transparent Thailand, the Transparency Thailand, and the Moral Promotion Center (Public Organization). It has signed the Thailand's Public Sector Collective Action Coalition Against Corruption: Year of Permit Facilitation and Anti-Bribery with PACC too. Moreover, MWA has taken part in the Office of National Anti-Corruption Commission's Integrity and Transparency Assessment for State Organizations.

Anti-Corruption Communications and Education

MWA has communicated and educated its members about anti-corruption throughout the year. In fiscal year 2020, it took the following actions:

- MWA organized training to educate its executives, employees and workers about corruption. The training, for example, addressed the topics of "NO GIFT: Is it wrong?" and "Transparent Way to Stay Away from Corruption";
- MWA communicated about anti-corruption with its employees via various media such as circulars, posters, "CG is Good" radio program, policy-making executives' meetings, Kok Nam Journal, CG's Digest Journal, Facebook: MWA CG Club, YouTube's MWA Corporate Governance, Line chat groups, and CG Game; and
- Communications with external stakeholders via various media including Kok Nam Journal, Facebook, YouTube and Stakeholder Day.

Conflict of Interest Management

MWA Board of Directors has accorded importance to conflict of interest management by laying down guidelines on how to handle conflict of interest under the MWA Good Governance Policy. According to the guideline, directors, executives and staff of MWA shall declare any direct or indirect conflict between their personal interests and MWA interests to prevent conflict of interest. According to MWA Board of Directors' announcement on the guideline on conflict of interest, persons working for MWA engage in a conflict of interest when:

- 1 Using MWA data for personal interests or interests of other persons
- 2 Being a party to or having interests in a contract signed with MWA or operating a business that competes against MWA operations in a way that puts their interests in conflict with MWA interests or in a way that affects their decision for MWA work

- 3 Serving as managing directors, managers, key shareholders, advisors, representatives, employees or workers of businesses that are under the supervision, control, and investigation of MWA in a way that puts their interests in conflict with MWA interests or in a way that affects their decision for MWA work except in events that MWA appoints them to the posts in those businesses in writing

Stipulations in Paragraph 1 above apply to the spouses of persons working for MWA too, as actions taken by spouses shall be held as their actions.

MWA has formulated the criteria on conflict of interest declaration based on the MWA order No. 496/2558, which was issued on 28 September 2015, and also the criteria on conflict of interest declaration for other persons carrying out assignments given by MWA based on the MWA order No. 143/2559, which was issued on 21 March 2016.

Declarations on conflict of interest are made using the form prepared by MWA, and submitted to their immediate supervisor based on the line of command at the end of each fiscal year. In case there is a possible conflict of interest during the year, declarations must be made to inform respective supervisors. The Audit Office is in charge of summarizing a report on conflict of interest at MWA. The report reveals:



14 MWA directors



Other 64 working officials assigned by MWA



4,341 MWA employees

In 2020, 14 MWA directors, 64 working officials assigned by MWA, and 4,321 MWA employees filed conflict-of-interest reports. None of them have had conflict of interest.

Regarding related parties' transactions that may cause conflict of interest and transfer of MWA benefits, MWA investigates both direct and indirect interests of bidders – be they natural persons, legal entities or central markets – in its procurement process. Considered are management and investment relationships or cross management/investments. The Audit Committee also reviewed relationships between contractors and persons handling MWA procurement or hiring. In fiscal year 2019, neither related parties transactions nor conflict of interest were detected.

Innovation and Digitalization

Sustainable Innovation Management

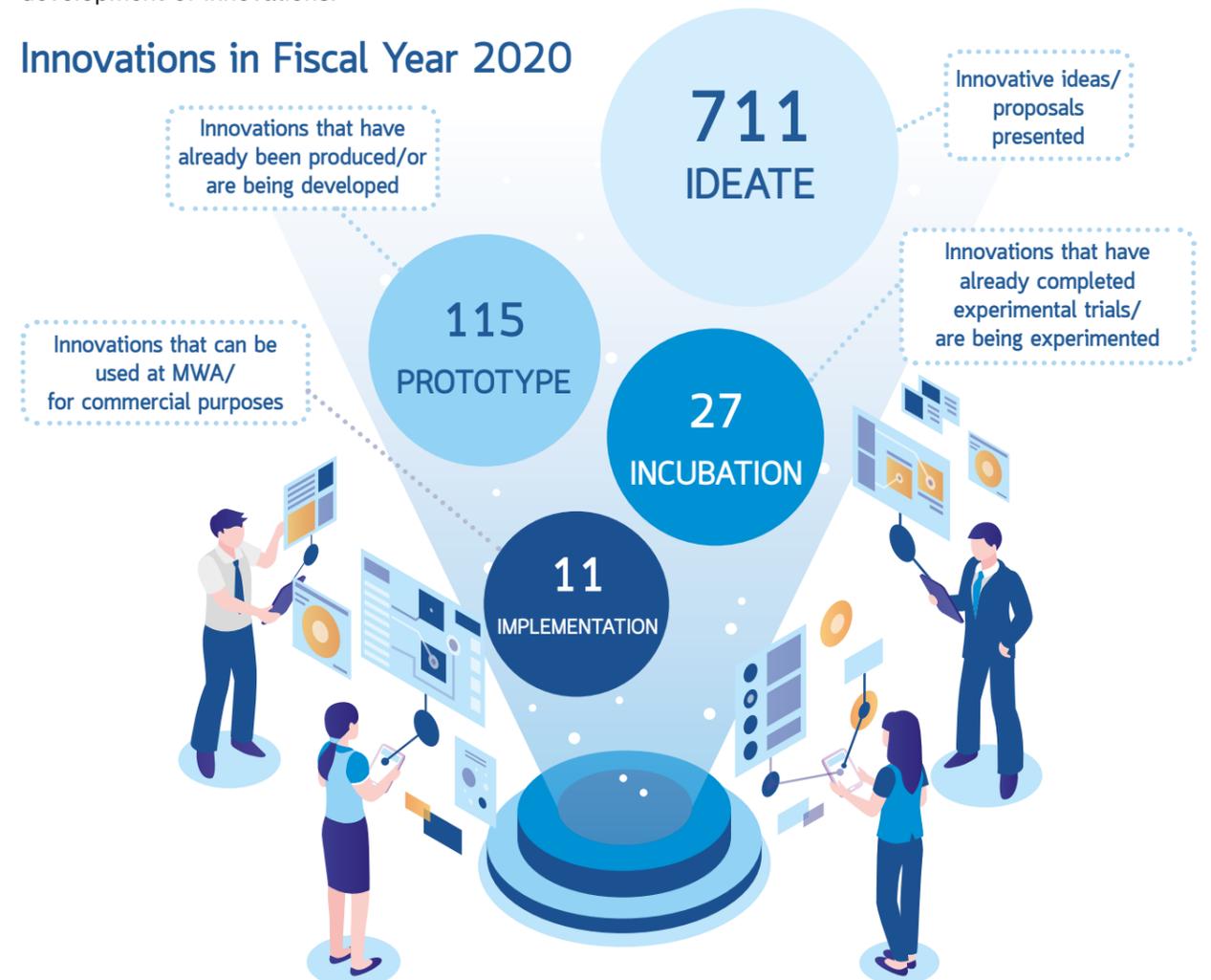
To create and develop innovations on a sustainable basis, MWA has laid down the following innovation management and personnel development systems:

Innovation Creation System

MWA has established a committee at organizational level and work panels at line level to manage innovations-related work in response to its policy on creativity and innovation management. Seeking to leverage knowledge and technology for the creation of innovations that respond well to customers' needs and expectations, this policy expects contributions from executives and staff alike.

To ensure its innovation-related works proceed in line with the 5th MWA State Enterprise Plan, MWA has drawn up the Master Plan and Action Plan on Research, Development and Innovation for Years 2020 - 2022. These plans have laid down vision, strategies, projects, goal-oriented plans and indicators of valuable waterworks innovations, development of innovation-creation process, personnel development, and innovative-society development. They, in all, have laid down the firm foundation for the sustainable development of innovations.

Innovations in Fiscal Year 2020



To create innovations, MWA has gathered creative/innovative ideas from four channels namely:

- 1) Innovation contests that have been held during MWA Academic Week every year;
- 2) Research grants for staff to study topics of their interest or develop new process at their unit;
- 3) Career-advancement training for staff that includes the topics of creativity and innovation, requiring staff to present innovation projects as a part of the training; and
- 4) Research grants for outsiders/external organizations whose researches are related to MWA's Innovation Theme

MWA has gathered findings from these four channels in the allocation of financial and non-financial resources for the creation of innovations. Also taken into account are relevant factors such as responsiveness to MWA's needs and cost efficiency. Output from researches has been developed into prototypes for experiments, trials and assessments prior to organizational-wide usage.



to determine their staff's knowledge/capabilities for innovation and use results for personnel-development planning with aim to upgrade the knowledge/capabilities for innovations across all groups of employees; and

- 3) Regarding motivation, MWA has offered both financial and non-financial motivators in encouraging staff to contribute to innovation culture. For example, MWA offers cash prizes to winners at its innovation contests that have been held as a part of MWA Academic Week. Research grants have also been awarded to staff. Participants in innovation research & development, moreover, are eligible to join special courses for their capability enhancement as well as overseas educational trips.

Personnel Development for Innovations

- 1) On the creation of innovation culture and value, MWA has integrated innovation into its corporate value or "QWATER". For team development, this corporate value encourages the development of innovations, the use of technology as well as knowledge/innovation development for the goal of achieving better performance and compliance with international standards. Also, MWA has drawn up plans to promote pro-innovation corporate culture/value by requiring executives to serve as role models for such promotion. Desirable characteristics of executives and staff are clearly specified. MWA has conducted activities to promote such characteristics for staff to attend ahead of their annual performance evaluation every year;
- 2) Personnel development seeks to upgrade personnel's knowledge/capabilities for innovations. In 2020, MWA conducted various training programs in knowledge for innovations. For example, "Kaizen" was provided to staff who would be promoted. Boot Camp, meanwhile was organized for staff who joined innovation contest. In addition, MWA held tests

Innovations in Year 2020

Chlorine Next

This innovative application was initially used by MWA staff to adjust chlorine amount anytime, anywhere, for the purpose of upholding water quality. Over time, this app has been developed further for the public too. Via this app, people can monitor water quality real time. Chlorine Next won an award from MWA Academic Week 2019 and the top prize from Singapore's International Innovation Awards 2019 - Service and Solution Category.



Anti-Salinity Tool

This model predicts salinity level of water in the Chao Phraya River around the Sam Lae Raw-Water Pumping Station one to three days in advance. Its forecasts are used to plan raw-water pumping for the eastern Prapa canal. Not only that Anti-Salinity Tool has won the Invention Award from the MWA Academic Week 2020, but it has also won the top prize at the International Innovation Awards 2020 contest.



Salt Board

This innovation issues water-quality alerts to the public via social-media platforms namely MWA Line account, Facebook account, Twitter account, website, etc. The alerts aim to reduce salty tap water's impacts. During drought crisis, tap water turns salty and has high level of conductivity and chlorine. Salt Board won the top prize at MWA Academic Week 2020.



Grey Water Projects

MWA provided a research grant in support of Grey Water Project in 2019. Under the project, a water-recycling system has been developed to treat used water from wash basins through filters and disinfection so that it can be used for flush toilets. In 2020, MWA funded the project further with aim to develop easier-to-maintain materials for the system.



MWA onMobile App for Urban Residents: Everything You Need to Know about Waterworks

MWA has upgraded its services further to New Normal services. After downloading MWA OnMobile, customers can enjoy faster and more convenient services thanks to digital technologies. The app usage also lowers the risk of COVID-19 in Bangkok, Nonthaburi and Samut Prakan. Via the app, customers can check their water-usage volume in the current month. They can also scan a barcode to make instant payments. They can even check water bills retroactively. The app, moreover, issues alerts about areas that are affected by low water pressure or water-service disruption. App users, in addition, can check water quality based on readings done by laboratories or water-quality monitoring stations real-time. They can also conveniently download pictures of leaking pipes as the app will identify exact location for relevant officials to fast check and repair. App users can also do the followings via the online platform:

การประสานครหลวง
ชวนคุณใช้บริการ e-Bill
และ e-Tax Invoice & e-Receipt

e-Bill
 (ใบแจ้งยอดค่าน้ำอิเล็กทรอนิกส์)
 เพื่อให้บ้านพักอาศัย หน่วยงานภาครัฐ และเอกชน สามารถดูใบแจ้งค่าน้ำผ่าน smart devices ต่าง ๆ ได้ทุกที่ สะดวกรวดเร็ว ตรงเวลา

e-Tax Invoice & e-Receipt
 (ใบกำกับภาษีและใบเสร็จรับเงินอิเล็กทรอนิกส์)
 ช่วยลดระยะเวลาในการรับใบกำกับภาษี / ใบเสร็จรับเงิน จาก 30 วัน เหลือเพียง 1 ชั่วโมง

ผู้ใช้น้ำสามารถลงทะเบียนเพื่อขอใช้บริการได้ 3 ช่องทาง โดยไม่เสียค่าใช้จ่าย

- ✓ แอปพลิเคชัน MWA onMobile
- ✓ เว็บไซต์ MWA e-Service (eservicesapp.mwa.co.th)
- ✓ ทางนิตยสารรับทำเรื่องสำนักงานประปาสาขา

ลงทะเบียน SCAN

MWA CALL CENTER 1125 | www.mwa.co.th | @MWAinland

QR Code: VDO introduction of e-Bill, e-Tax Invoice & e-Receipt

MWA onMobile
แอปฯ ของคนเมือง ครบทุกเรื่องน้ำประปา

- ติดตั้งประปาใหม่ได้ง่าย ๆ แค่ปลายนิ้ว
- คลิกปุ่ม ฉุกเฉิน ค่าน้ำชำระ: ช่วยกันใจผ่านบัตรเครดิต
- ใบแจ้งค่าน้ำของใคร สแกนง่ายได้: สมบาย ๆ ไม่ต้องลงทะเบียน
- ผู้พันค่าน้ำไม่หายไหนใคร
- พบเห็นท่อแตก-รั่ว เต็งง และ แฉ่วเฮง: ก็ช่วยขอประ-หือได้
- รวมการรายละเอียดใบแจ้งค่าน้ำประปาไว้ในมือคุณ
- ขอใช้ไฟฟ้า/ตรวจสอบค่าไฟฟ้าของ กฟน.

ดาวน์โหลดฟรีที่ Google Play และ App Store

MWA CALL CENTER 1125 | www.mwa.co.th | @MWAinland

- Request water-meter/electricity-meter new installations (in MWA service areas);
- Paying for the installation of new water meter and overdue water bills via Visa/Mastercard credit cards;
- Following news/updates about water quality in Bangkok, Nonthaburi and Samut Prakan on a daily basis; and
- Subscribing for e-Bill (electronic water bills), e-Tax Invoices, e-Receipts. Via the app, water users can get an e-Tax invoice & e-Receipt within an hour. With hard copies, they will have to wait for 30 days. Such e-documents also remove the problems of document loss and reduce paper usage.

Policy Involvement

MWA has taken part in the government’s formulation of waterworks policies during the stages of consultations, policy formulation, planning, decision making and implementation of related work plans especially in regards to water-resource management and waterworks direction. In preparing its work plans/projects, MWA has also engaged stakeholders by holding critical-discussion meetings on its strategy (state-enterprise plan) every year. A recent critical-discussion meeting on the 5th MWA State Enterprise Plan was held on 29 July 2020. Thanks to its policy involvement, MWA direction and action plans are geared towards long-term success and in line with the country’s development direction. On the overall, MWA has participated in policy involvement via the followings:

- MWA governor has sat on the work panel on water-for-consumption management. Operating under the **Steering Subcommittee on Water Resources Management Master Plan**, this panel has the duty to analyze Thailand’s water resources management and lay down water-resource-management development framework to address issues that need holistic solutions or issues needed to the 20-year Water Resources Management Master Plan to achieve its goals;
- MWA has prepared the action plan against drought via the **Study Project for “Water Resources Master Plan”** in collaboration with the Office of the National Water Resources;
- **MWA signed a Memorandum of Understanding (MOU) 2019 - 2024** cooperation for the development and management of Om Canal, Bang Luang Chiang Rak Canal, and Ban Phrao Canal with the Pathum Thani provincial authority, National Science and Technology Development Agency, Wastewater Management Authority, Thammasat University, the Pathum Thani Irrigation Project and various local agencies. Signed by 19 agencies, the MOU lays down the guideline for cooperation on six topics namely:

1. Water System Management;
2. Wastewater Management and Aquatic Weed Eliminating;

3. Monitoring, Investigation and Control of Pollution Sources;
4. Promotion of Public Participation;
5. Developing Areas as Attractions; and
6. Establishing Canal Development Committees

In fiscal year 2020, 29 agreements were inked under the MOU. These agreements covered:

- Projects to install trunk mains in the areas under the jurisdictions of subdistrict administrative organizations;
- Projects to expand MWA services across urban towns in Samut Prakan;
- Vocational Education Management;
- Academic Affairs, Researches and Innovations;
- Integrated planning and support for the development of areas in regard to public utilities, electricity and waterworks for Ban Mankhong Projects;
- Monitoring project on leaking water pipes;
- Cooperation with the Bangkok Metropolitan Administration on consolidated construction contracts; and
- MOU on Cooperation Agreement on NRW-Advanced Water Leak Monitoring Pilot Project

The Thai Waterwork Association (TWWA), which was established in 1971, has brought together people working in waterworks-related professions. Its board of directors has been elected, with members working like volunteers to ensure TWWA serves as the center to promote waterworks-related professions in Thailand. In pursuit of its goals to raise waterworks-related professions’ standards, TWWA has studied, researched, gathered and distributed academic knowledge including safety knowledge that affects people’s welfare.

MWA is involved in the formulation of the association’s policies, scope of work, regulations, rules, and work procedures to ensure that the association works in line with its founding objectives. MWA governor had served as the president of TWWA (for two years between 27 January 2018 and 27 January 2020). Presently, PWA governor has also been its president (tenure beginning on 25 May 2020 and ending on 25 May 2022).

Economic Performance

Net profit
5,622.96
million baht

Remittance
to the state
3,413.20
million baht

EBITDA
10,475.20
million baht

Total revenue
18,044.95
million baht

CSR
spending
297.60
million baht

Factors Affecting Financial Situation and Operating Results

In fiscal year 2020, MWA faced several challenges namely drought, brackish water that affected raw-water quality and volume, as well as COVID-19 outbreak. As lockdown measures were introduced in the wake of COVID-19, MWA's water-charges revenue had fallen. Water charges have provided a main source of MWA's revenue. However, as COVID-19 outbreak temporarily disrupted economic activities especially those in manufacturing, export and tourism industries, water sales to industrial businesses, shopping complexes and hotels had reduced. Water sales to residential group, meanwhile, slightly increased because of the Work-from-Home practice. Recognizing COVID-19 impacts on water users, MWA introduced several remedial measures such as discount on water charges, refund of water deposits, and exemption of water-service suspension penalty. In all, MWA spent about 1,700 million baht on the remedial actions. MWA also reviewed and revised its strategies to best respond to the changing context. Its focus moved to the development of related businesses so as to generate supplementary revenue and also to cooperation with the Provincial Waterworks Authority for waterworks services on the suburbs of their service areas, which will also enhance people's access to clean and safe water. MWA embraced disruptive technologies too in its bid to fulfil water users' expectations with superior services.

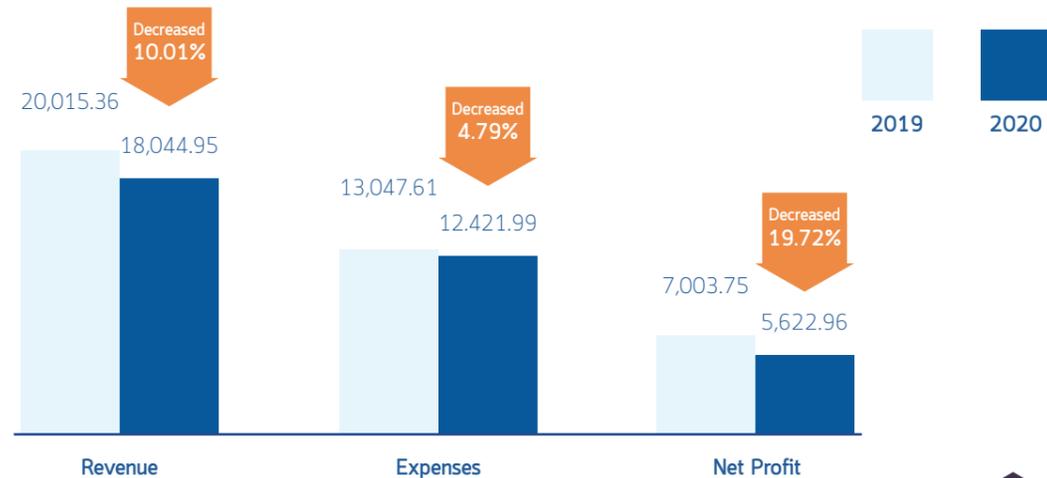
Regarding expenses, MWA had a high water-loss rate because of leaking pipes. The leakage stemmed from the fact that MWA's waterworks infrastructure and water-pipe network had already been in use for a long time. Expenses for their maintenance and water-loss management, as a result, soared. In addition, MWA's raw-water sources had faced impacts from the changing environment namely global warming, drought, and seawater invasion, which had threatened to lower raw-water quality. In the face of COVID-19 situation, MWA closely monitored water quality. In complying with the World Health Organization's (WHO) guidance, it increased chlorine amount to boost antibacterial and antiviral properties of its water and shouldered the extra cost. As trends suggest raw-water quality had been dropping, MWA responded to the situation by improving its management in regard to raw water. It also worked with the Royal Irrigation Department in monitoring water situation and stabilizing raw-water system to ensure adequate water supply even in abnormal times. In addition, MWA formulated area-based strategies for water-loss and water-pressure management. It boosted its capabilities to respond to emergencies as well. To implement its Water Safety Plans in a systematic manner, MWA expanded its water-pipe network and service areas on top of investing in major waterworks improvement projects. Furthermore, MWA focused on maximizing

its asset-usage efficiency, appropriately managing risks, and properly allocating resources so as to achieve good rate of return. Some financial factors also affected MWA operations namely deposit interest rates, lending interest rates, and currency exchange rates. In 2020, yen appreciated against baht. However, MWA had prepared Cross Currency Swap (CCS) and was thus able to reduce risks from fluctuating currency exchange rates. Also, MWA's strong emphasis on the management of loans and

excess liquidity has enabled it to have low liabilities and enjoy solid financial situation despite all the aforementioned factors and impacts.

Because MWA's organizational management has addressed risks at all levels and constantly improved its capabilities in pursuit of becoming a high-performance organization (HPO), it is financially strong and grows well in line with national-development, social-development, and environmental-development directions on a sustainable basis.

In fiscal year 2020, MWA recorded the net profit of 5,622.96 million baht. The amount went down by 1,380.79 million baht from a year earlier because water-charges revenue – a main source of revenue – dropped. The net profit decreased even though total expenses in fact were lower when compared with last year.



Indirect Economic Impacts

Sustainable Growth in the Society

MWA is committed to producing and distributing tap water to people, improving their quality of life, and improving/supporting infrastructure projects that contribute to sustainable growth in the society.



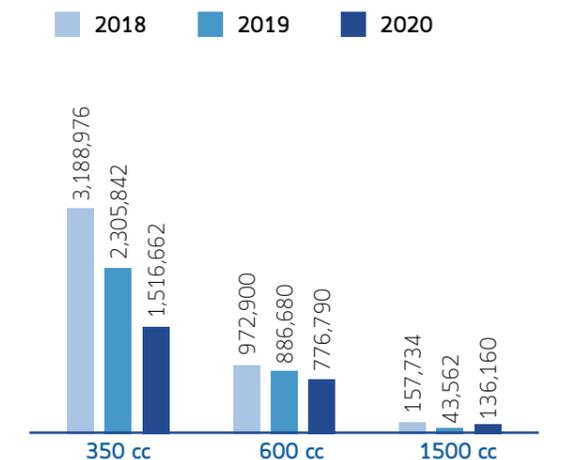
Donations to Charity Causes

2018 Budget: 19.35 million baht
 2019 Budget: 54.31 million baht
 2020 Budget: 84.94 million baht

Water for Charity

2018 Budget: 94,245.18 cubic meters
 2019 Budget: 123,204.16 cubic meters
 2020 Budget: 90,049.97 cubic meters

Volume of Donated Papa Water Bottles between Fiscal Years 2018 and 2020 (Baht)



Comprehensive and Equal Access to Clean Water: Project to Expand Services to All Urban Areas

The project to expand waterworks services to all corners of urban towns is not cost-effective in a business sense. However, MWA has proactively implemented the project since 2006 to ensure it will be able to accommodate significant demand from fast-growing towns in the future, to boost people's equal access to clean and safe tap water, to upgrade people's quality of life on a sustainable basis, and to respond to government policies on the reduction of social inequalities and enhanced access to public services for the ultimate goal of comprehensively and fairly providing people with quality services.

On top of giving people comprehensive and equal access to clean water for consumption, this project has reduced households' expenses in finding water from other sources such as groundwater sources, bottled water, raising the quality of life, actively tightening ties between MWA and community, and easing land-subsidence problems. If MWA's services fully cover all areas under its supervision and all communities there agree to use its waterworks systems, land will sink 9 centimeters less in 20-year period.



QR Code: VDO of Project to Expand Services to All Urban Areas

Fiscal Year	Number of Routes	Length (Kilometers)	Investment Budget (Million Baht)	The Number of Direct Beneficiaries (Households)	The Number of Direct Beneficiaries (Persons)*	The Number of Indirect Beneficiaries (Non-Registered Population) (Persons)**	People Who are Beneficiaries (Persons)	Reducing Household Expenses Related to Procurement of Water for Consumption (Baht) ***
2006 - 2007	170	210	314	10,045.00	32,144.00	17,839.92	49,983.92	1,627,792.25
2008	111	124	141	3,700.00	11,840.00	6,571.20	18,411.20	599,585.00
2009	93	118	193	3,540.00	11,328.00	6,287.04	17,615.04	573,657.00
2010	127	201	276	5,950.00	19,040.00	10,567.20	29,607.20	964,197.50
2011	189	230	331	6,930.00	22,176.00	12,307.68	34,483.68	1,123,006.50
2012	419	344	674	8,315.00	26,608.00	14,767.44	41,375.44	1,347,445.75
2013	55	70	153	2,284.00	7,308.80	4,056.38	11,365.18	370,122.20
2014	96	138	250	2,610.00	8,352.00	4,635.36	12,987.36	422,950.50
2015	186	178.83	320.33	4,160.00	13,312.00	7,388.16	20,700.16	674,128.00
2016	238	273.44	389.27	4,886.00	15,635.20	8,677.54	24,312.74	791,776.30
2017	113	157.87	296.16	2,367.00	7,574.40	4,203.79	11,778.19	383,572.35
2018	162	198.03	422.24	1,620.00	5,184.00	2,877.12	8,061.12	262,521.00
2019	123	116.93	78.245	1,679	5,372.80	2,981.90	8,354.70	272,081.95
2020	88	108.53	206.09	1,040	3,328.00	1,847.04	5,175.04	168,532.00
Total	2,170.00	2,468.63	4,044.34	59,126.00	185,875.20	103,160.73	289,035.93	9,412,836.30

* Thai households have 3.2 members each on average. Source: Population and Household Census 2010, National Statistical Office, (2000 - 2010). (Note: In 2020, the survey could not be conducted due to COVID-19 outbreak.)

** Non-registered population in Bangkok accounted for about 1.776 persons per household. Source: Article Titled "Bangkok's Population" from <http://cpd.bangkok.go.th/cpd/tp/planpop.html>, the Technical and Planning Division, City Planning Department

*** Reducing household expenses related to procurement of water for consumption by 162.05 baht/month/household. Source: Satisfaction Survey among People Living along Pipeline Routes and Benefiting from Projects in Fiscal Year 2013

Social Performance



Water Quality

Nowadays, fast-changing social, economic and environmental situation has significantly affected the entire waterworks systems and posed several physical, chemical and biological risks to water quality. To ensure its water-quality management is sustainable and to upgrade itself to an international organization of excellence, MWA has embraced the World Health Organization's (WHO) Water Safety Plan (WSP) since 2012.

WSP refers to the management approach to handle water-quality risks throughout the entire process from catchments to consumers. WSP is rooted in three basic principles as follows:

- Protect** Protect raw-water sources from contamination;
- Remove** Remove contaminants; and
- Prevent** Prevent recontamination

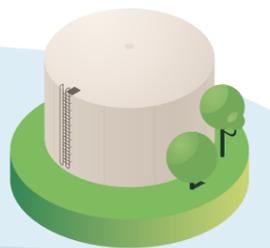
MWA's WSP has laid down policies, set up work panels, and gone into detail about waterworks systems. Hazards are identified and risks are assessed. Based on the identification and assessment, control measures and solutions are prepared. MWA has constantly reviewed and improved its WSP. At MWA, WSP applies to raw-water system, water-production system, water-transmission and water-delivery system, and service system for water users. WSP, for example, has addressed major risks in various systems as follows:



Raw-Water System: WSP seeks to reduce hoofed animals' excretion into raw-water sources by installing fences along Prapa canals. Moreover, it curbs its raw water's salinity by avoiding the pumping of raw water into Prapa canals at the time salinity level is high;

Water-Production System: WSP deploys preventive measures to uphold the stability of machinery and equipment in water-production system and to ensure they can function without any interruption in regard to both quantity and quality in a controlled environment. WSP prescribes constant monitoring and tests of quality through an online platform (based on various indicators including turbidity level and free residual chlorine) so as to secure timely response in events water quality is affected. As parts of WSP, MWA has reduced risks that may emerge from the shortage of necessary chemicals for water production. MWA has prepared management, transportation and stock of necessary chemicals in a way that ensures that there will be adequate supply throughout the year.

Water-Transmission and Water-Delivery System: WSP ensures clear-water tanks are in good conditions, with its content free from turbid sediments and biofilm. Tank cleaning is done at least once every five years. Chlorine-control system is installed at the end of the line of each water-delivery pumping station so as to reduce contamination risks during water delivery. As parts of WSP, there are systems to prevent the corrosion of trunk mains, to monitor water pressure in water-delivery system, and also to examine leaks along water pipeline.



Service System for Water Users: MWA maintains and repairs the system in line with standards so as to reduce contamination. After each maintenance/repair, MWA tests water quality based on prescribed criteria.

To assess water safety and health impacts on water users, MWA has tested water quality in every stage of water production and service delivery. The assessments are done for water from all water-treatment plants, water-delivery pumping stations, and all water pipelines in MWA service areas that cover Bangkok, Nonthaburi, and Samut Prakan. In charge of the assessments is MWA's Water Quality Department with parallel tests conducted by external agencies namely the Mahidol University's Faculty of Public Health, the Office of Atoms for Peace, the Department of Medical Sciences, the Thailand Institute of Scientific and Technological Research, United Analyst and Engineering Consultant Company Limited, and Central Laboratory (Thailand) Company Limited. Furthermore, MWA has released water-quality data from automatic monitoring system and lab tests via its website so that water users can check water-quality data anytime

The results of water tests conducted in every of MWA's operational stages were compared against

criteria in fiscal year 2020. Summary is shown in the following table. Raw water was compared with Quality Standard on Type 3 Surface Water of the National Environment Board's Announcement No. 8 (B.E. 2537). Water from water-treatment plants, water-delivery stations and water pipeline was compared with the MWA Water Quality Criteria of B.E. 2560, which is based on WHO's recommendations. If water quality does not meet MWA criteria, urgent improvement is done. However, if chloride level soars above proper limits due to seawater intrusion into the Chao Phraya River, MWA's conventional water treatment system cannot solve the issue. The system is not capable of eliminating chloride or salinity.

Regarding water quality in water pipelines, details related to important parameters are summarized in the following table. So far, MWA CALL CENTER reported that in fiscal year 2020, it received 1,621 complaints about turbid water and 151 complaints about water smell (not chlorine smell). Regarding brackish water, MWA CALL Center mostly received queries about when brackish water can be expected as customers wanted to store water to avoid the problem.

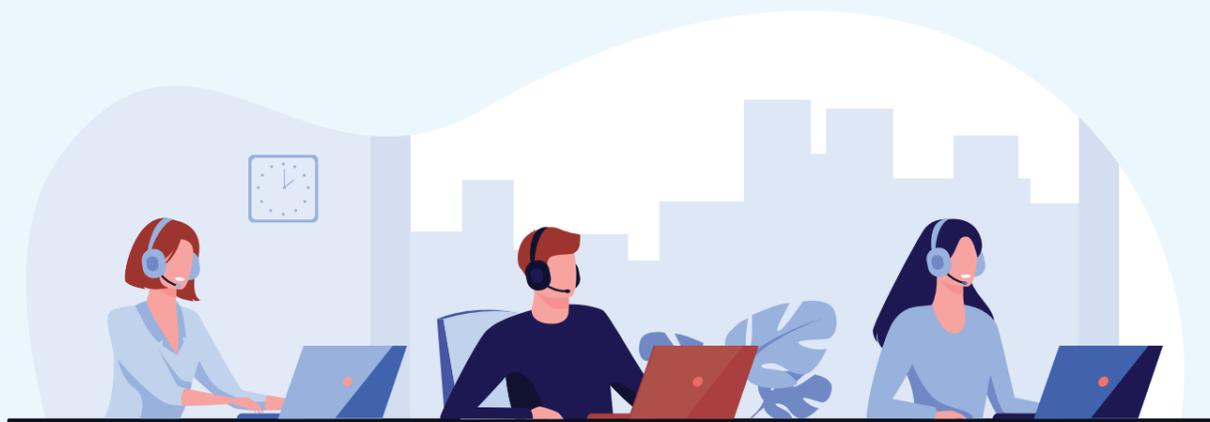


Table showing daily water-quality tests during fiscal years 2018 - 2020

Water Quality	Fiscal Year			Criteria
	2018	2019	2020	
Turbidity (NTU)	0.40	0.23	0.19	< 1.0 NTU
Acidity and Alkalinity	7.21	7.19	7.37	6.50 - 8.50
Free Residual Chlorine	0.50	0.55	0.79	0.20 - 2.00 mg/L
Random Samples	3,040	3,196	3,138	

Water-Quality Tests for Each of MWA's Operational Stages Comparisons with Applicable Criteria in Fiscal Year 2020 (October 2019 - September 2020)

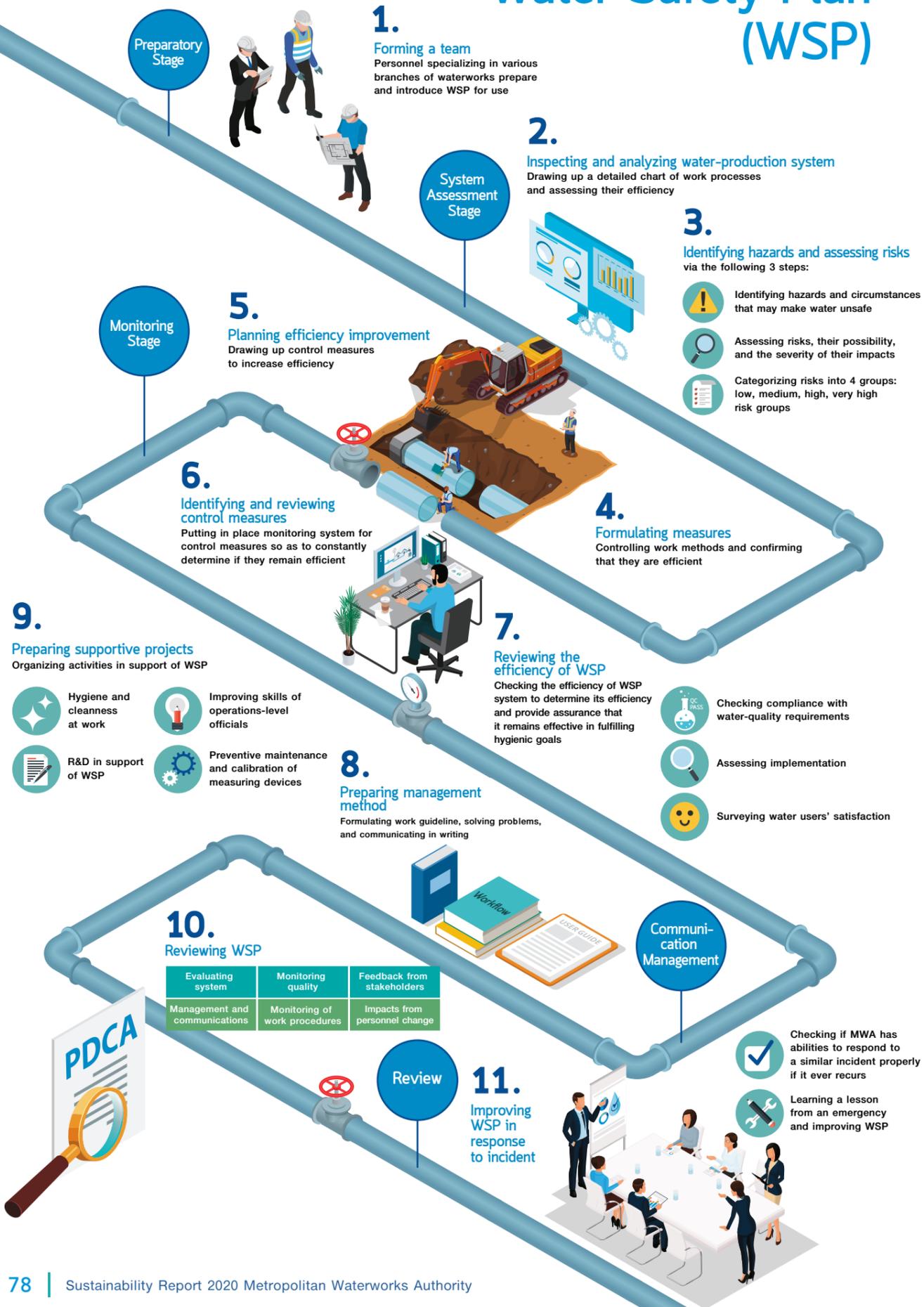
	Water Quality Standard on Type 3 Surface Water ^a		MWA's Water Quality Criteria of B.E. 2560 Based on WHO's Recommendations					
	Raw Water		Water Treatment Plant				Water-Delivery Stations	Water Pipelines
	Eastern	Western	Bang Khen	Mahasawat	Samsen	Thonburi		
Number of Specimens	12	12	12	12	12	12	12	3138
Specimens that fail to comply with criteria/standard (Each specimen may fail in more than one criterion) ^b	11	2	1	-	-	-	1	40

Source: Monthly Reports on Water Quality Monitoring, Water Quality Monitoring Division, Water Quality Department

Notes:

- Quality Standard on Type 3 Surface Water of the National Environment Board's Announcement No. 8 (B.E. 2537), which is issued based on the stipulations on surface-water quality standard of the Enhancement and Conservation of the National Environmental Quality Act of B.E. 2535.
- Non-compliance details:
 - Raw water on the eastern side: 4 specimens related to Dissolved Oxygen (DO), 3 specimens related to Biochemical Oxygen Demand (BOD), 2 specimens related to both DO and BOD; 1 specimen related to DO and Total Coliform Bacteria; and 1 specimen related to Fecal Coliform Bacteria;
 - Raw water on the western side: 1 specimen related to BOD and 1 specimen related to Total Coliform Bacteria;
 - Bang Khen Water-Treatment Plant: 1 specimen related to chloride
 - Water-delivery stations: 1 specimen related to chloride
 - Water pipelines: 1 specimen related to turbidity; 37 specimens related to chloride; and 2 specimens related to E. coli

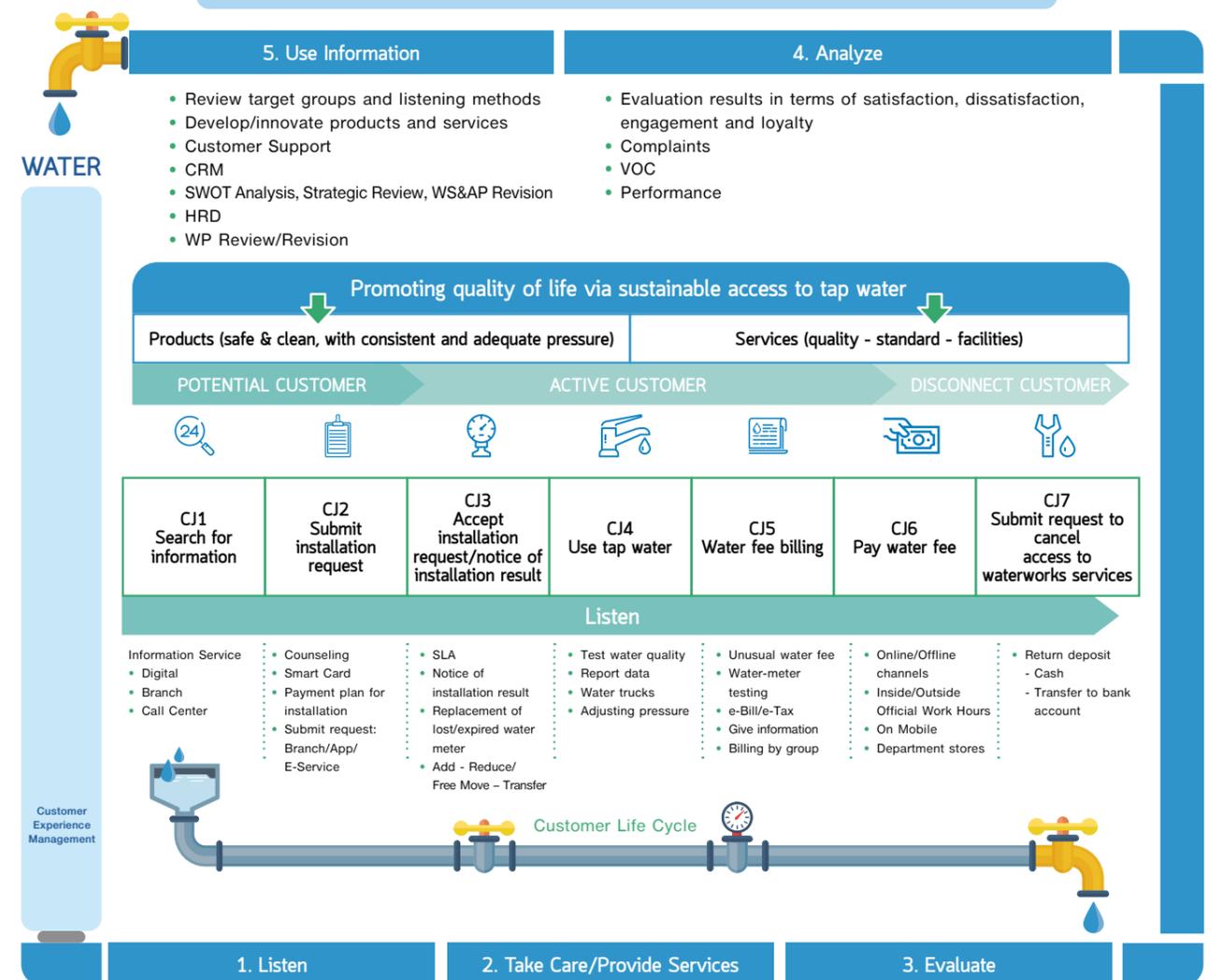
Water Safety Plan (WSP)



Customer Relationship Management

To provide services in response to customers' needs and expectations, MWA has created channels and methods to listen to the Voice of the Customer. Data from these channels are used in managing customer relations in regards to products or tap water "that is clean and safe with consistent and adequate pressure" and also "fast, convenient, and highly accessible services" for every aspect of customer's life cycle.

Commitment Model: MWA's Customer Experience Management

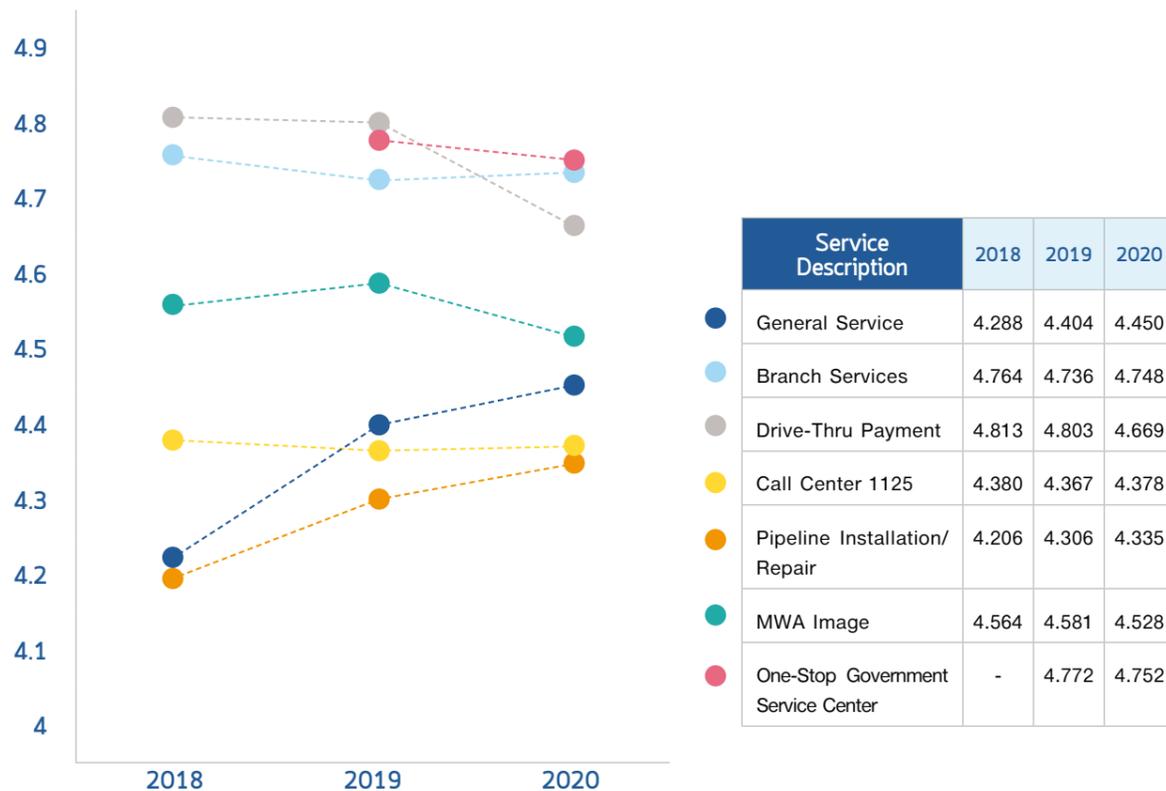


To upgrade services and lay down framework for the creation of customer satisfaction and the generation of more revenue, MWA has drawn up the Customer & Marketing Strategy for Years 2021 - 2022. The strategy has been developed based on data on customers and products, analyses of customers' needs/expectations, analyses of work environment, market competition, and product competitiveness. Backed by various tools, analyses are consistent with MWA policies. The Customer & Marketing Strategy for Years 2021 - 2022 focuses on three parts. Firstly, it seeks to build waterworks system's stability and security. Secondly, it seeks

to upgrade MWA to an organization of excellence. Thirdly, it seeks to promote MWA's good ties with stakeholders and adherence to corporate governance for sustainability through six projects namely: (1) Water Coverage 100% Project; (2) Booster Pump Project; (3) Pressure Pump Project; (4) Auto Flushing Valve Project; (5) Digital Service Project; and (6) Project to upgrade customer relationship. These six projects promise to raise customer satisfaction, comprehensively expand MWA services, and increase MWA's revenue on a sustainable basis.

Survey on Customer Satisfaction about MWA Services

Honoring its Service Level Agreement (SLA) in every step of service delivery, MWA requires all its units to review their operating results so as to improve standard service time. Challenging goals are set as MWA aims to exceed customer expectations with fast and convenient services, and also to make preparations for Digital MWA (survey results are shown in the below table). Surveys on customer satisfaction between 2018 and 2020 revealed that "water-pipeline installation/repair" have got the lowest score, below 4.5 points, when compared with other aspects of services.



Customer Relationship Upgrade

Projects to Upgrade Customer Relationship

MWA has upgraded its relationship with all groups of customers and has boosted their confidence in its services. In line with customers' needs/expectations, the upgrade covers the following projects:

MWA Meets People Project

This project aims to promote good ties with and proactively deliver services to Residential Group (R) or households that have used MWA water for consumption. All 18 branches of MWA have proactively conducted activities to build good customer relationship via their mobile units. These mobile units have visited communities of water users to provide services, gather opinions, and deliver support. For example, these mobile units have given waterworks knowledge, cleaned water storage tanks, and offered mobile medical services. During some activities, MWA has arranged for scientists to check water quality in communities. Moreover, MWA has communicated with water users so as to promote mutual understanding and to jointly prepare plans for communities that will be affected by water-pipeline installations/repair. Such communications, which allow MWA to listen to communities about their problems, promise to reduce conflicts. In fiscal year 2020, MWA implemented "Change for Better Care" Project to raise public awareness of its service and waterworks-system development that aimed at adequately and comprehensively giving people access to clean and safe water of World Health Organization's standards. Under the project, 72 events were organized. Moreover, the project presented PR materials on MWA onMobile and Line ID: @MWATHailand too. In addition, MWA prepared e-Bill, e-Tax Invoice and e-Receipts for its customers so as to maintain social distancing during the outbreak of COVID-19. MWA also promoted water-saving techniques and knowledge of water-saving devices that were certified by MWA and awarded its water-saving label. The promotion aimed to raise public awareness of the value of water sources and environment. Furthermore, MWA conducted a satisfaction survey with aim to use the findings for the improvement of its services and transparency campaigns. The survey showed customers gave 4.41 points (out of possible 5) to MWA Meets People Project.



Government Easy Contact Center (GECC) Certification

MWA is committed to upgrading its services in response to the government policy on serving as a highly-accessible agency that fast provides advice and convenience to people. Guided by the commitment, MWA has constantly improved its services in all aspects by pursuing Government Easy Contact Center (GECC) standard. The government has required all ministries, departments, provincial authorities, and relevant state enterprises to embrace the standard with aim to ensure that they efficiently deliver services to people and comply with the Licensing Facilitation Act B.E. 2558.



QR Code: VDO clip on "GECC"

MWA Top-Tier Project

Launched in fiscal year 2017, MWA Top-Tier Project was built up on the Best Care Service & Key Account Project. Under MWA Top Tier Project, MWA have called on commercial (C) and Industrial (I) water users that each use at least 10,000 cubic meters of water per month. Meetings have been sought at their places as MWA seeks to recommend its services and listen to customers for the ultimate goal of fulfilling customer expectations fast and accurately. Such meetings also help enhance MWA's relationships with customers who may transform into trade partners. Such partnerships, when forged, will deepen customers' ties to MWA on a sustainable basis. Between fiscal years 2018 and 2020, MWA Top-Tier Project scored 4.50, 4.63, and 4.56 respectively out of possible 5.





MWA received GECC plaque and emblem from Deputy Prime Minister Wissanu Krea-ngam On 21 September 2017 at the Santimaitree Building, the Government House.



GECC Label

In fiscal year 2017, all 17 MWA branches were certified as GECC (except the Suvarnabhumi branch that was under construction and in the process of relocation). All of them won GECC (Blue) label. This certification is valid for three years (2017 - 2019).

In fiscal year 2019, GECC standard were adjusted with the introduction of three levels of certification. The Phasi Charoen Branch piloted in the new system. It successfully won the Advanced GECC (Silver) level.



Advanced GECC Label (Silver)

Levels of GECC Certification

- Basic Total score: 70 - 79
- Advanced Total score: 80 - 89
- Excellent Total score: 90 - 100

In fiscal year 2020, all 17 MWA branches were certified either as Basic or Advanced GECC. MWA therefore is now a state organization whose all service delivery units (branches) have passed GECC standards. The Phasi Charoen Branch's certification, which was granted in 2019, is valid for three years (2019 - 2021).



Advanced Level (7 branches)

Phasi Charoen Branch, Samut Prakan Branch, Mansi Branch, Prachachuen Branch, Min Buri Branch, Suvarnabhumi Branch, and Bang Bua Thong Branch



Basic Level (11 branches)

Sukhumvit Branch, Phra Khanong Branch, Lat Phrao Branch, Phaya Thai Branch, Thung Mahamek Branch, Bang Khen Branch, Taksin Branch, Suksawat Branch, Nonthaburi Branch, Bangkok Noi Branch, and Mahasawat Branch

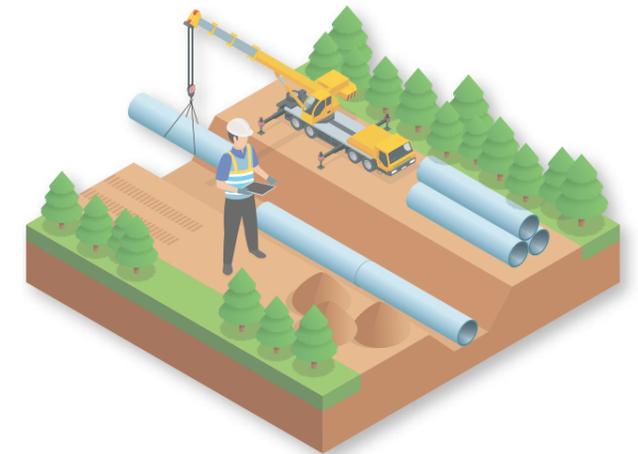
Focus on Becoming High-Performance Organization

As quality and service improvement must be at the heart of all MWA members, "development" has been integrated into MWA corporate culture. Staff are encouraged to keep improving themselves, in terms of knowledge and understanding so as to keep pace with changing context. MWA has also leveraged innovations and digital technologies to make its services available to customers anytime, anywhere. For example, customers can now access services via MWA onMobile and e-Service that covers e-Bill, e-Tax and e-Receipt. Moreover, MWA has developed various channels to listen to the Voice of the Customer in its bid to identify customers' true needs and develop collaboration/integration that will deliver fast, efficient and caring services to customers. A service mind in MWA's DNA or in all of its members will ensure MWA becomes an increasingly-better and leading service provider.

Partnership and Collaboration

Partnership and Collaboration to Work Efficiently

MWA has driven its organization through not only support from its personnel at all levels but also cooperation from external organizations, paving way for its operations to move ahead consistently and efficiently. Below are details about MWA cooperation and partnerships with other organizations:



Coordination and Cooperation for Pipeline Constructions/Installations

MWA needs to use spaces of other organizations in laying down pipeline networks for its water transmission and water delivery from its plants to customers' places. For its pipeline constructions and installations, MWA has coordinated with other agencies to ensure its works can be done simultaneously with their road/footpath improvement projects.

- **Ministry of Interior:** Bangkok, Nonthaburi, Samut Prakan authorities, local administrative bodies (provincial administrative organizations, municipalities, and subdistrict administrative organizations), and the Metropolitan Electricity Authority

- **Ministry of Transport:** Department of Highways, Department of Rural Roads, Marine Department, State Railway of Thailand, Mass Rapid Transit Authority of Thailand, Airports of Thailand, and Expressway Authority of Thailand
- **Ministry of Agriculture and Cooperatives:** Royal Irrigation Department



Coordination and Cooperation with Local Communities in Water Source Conservation: Raw Water Sources and Prapa Canals to Direct Water to Water Treatment Plants

- **Ministry of Interior** in Pathum Thani, Kanchanaburi and Nakhon Pathom provinces
- **Ministry of Agriculture and Cooperatives** Royal Irrigation Department, and Office of the National Water Resources
- **Electricity Generating Authority of Thailand** Participation in “Meetings with People Living Upstream, Midstream and Downstream” so as to integrate cooperation and foster good ties between the organization and authorities related to customer care



Coordination and Cooperation on Academics Affairs, Technologies and Standards

- World Health Organization (WHO) in regards to Water Safety Plan
- Ministry of Public Health, Department of Health in regards to health academics, water quality and Water Safety Plan
- Ministry of Industry, Thai Industrial Standards Institute in regards to engineering standards, pipes, and other waterworks equipment
- Ministry of Defence, Royal Thai Navy, Hydrographic Department in regards to seawater level, high tide and low tide
- Asian Waterworks Utilities Network of Human Resource Development (A1-HRD), Japan
- Water Quality Asian Cooperation Network (WaQuAC-Net), Japan
- International Water Association (IWA)
- American Water Works Association (AWWA)
- Thai Waterwork Association



Coordination and Cooperation on Good Governance and Corruption Prevention

- Foundation for a Clean and Transparent Thailand Network
- Memorandum of Anti-Corruption Cooperation among the National Anti-Corruption Commission, the State Enterprise Policy Office, and 55 state enterprises that was signed on 28 May 2014



Sustainability Disclosure Community (SDC)

MWA has joined the Sustainability Disclosure Community. Established by Thaipat Institute, this community aims to create learning spaces and forums whereby members can exchange their experiences in sustainability disclosure, to drive Thai organizations’ leading role in disclosure of sustainability data at the regional and international levels, to ensure members’ sustainability disclosure in the long run.



Occupational Health and Safety

MWA has managed its occupational health and safety in line with applicable laws such as the Occupational Health, Safety and Environment Act B.E. 2554, the Ministerial Regulation on the Formulation of Occupational Health, Safety and Environment Management Standard B.E. 2549, and the State Enterprise Labor Committee's Announcement on State Enterprises' Minimum Employment Standard (No. 3) B.E. 2555. The applicable laws are the bases for MWA's formulation of the Safety, Health, Environment: (SHE) policy, which was announced on 18 July 2019. Applying to all MWA units and employees/workers at all levels, this policy supports the integration of social and environmental responsibility to MWA's production process and service-delivery process. These processes are the core parts of MWA's value chain and operations. All MWA units are required to comply with the applicable laws and MWA policy as follows:

- 1 SHE works are the first and foremost duty of all employees/workers;
- 2 All units must strictly comply with laws, regulations, safety manual, and SHE standards;
- 3 All units must support the improvement of work conditions and environment for good hygiene and safety;
- 4 All units must conduct communications to provide knowledge, understanding, good sense, and participation in SHE works;
- 5 All units must seriously promote and support sustainable SHE works with resources and budget; and
- 6 All units must be committed to constant upgrade of environmental protection by means of resource efficiency, energy efficiency, and the minimization of pollution and environmental impacts from operations.

Six-Step SSHE (Safety, Security, Health and Environment) Model



To draw up short-term and long-term SSHE plans for SSHE Committee to consider and approve;



To review/announce SHE policies;



To draw up action plans for each SHE committee, to compile safety manual, and to identify safety indicators;



To communicate about/ implement the plans and to have MWA safety workplace contest held;



To monitor and evaluate implementation; and



To analyze and summarize implementation results/safety indicators and report them to MWA governor once a year

MWA has a process to create and promote safety, welfare, occupational health and environment works in a systematic manner. This process is under the supervision of the SSHE Committee. Chaired by the MWA governor, this committee has as its members the chairs of 21 SHE committees. Established under a ministerial regulation, each SHE committee is appointed for each MWA workplace. On each SHE committee are the representatives of employer (executive-level employees) and employees (operational-level employees). SHE committees convene their meetings once a month to discuss on safety issues and communicate about policies with operational-level employees at their workplace. As the central unit for laying down MWA's safety management system, the Occupational Safety and Health Division supports the 5th MWA State Enterprise Plan's SO-9, Strategy 2.4 for Digitalize HRM and HRD, human-resource roadmap, and high-level executives' communication roadmap.

MWA has hired safety professionals as occupational safety officers for its 21 workplaces. Moreover, MWA set up a panel of occupational safety comprising employees who have completed various levels of occupational-safety training and received certificates from the Safety and Health at Work Promotion Association (Thailand) under Patronage. This panel is in charge of nominating

occupational safety executives and occupational safety supervisors for MWA governor to appoint. Together with the SHE committees, the panel formulates policies to drive SHE works and set their standards. Considered are all issues that may affect employees and communities. The committees and the panel have also made necessary preparations among staff via various activities including fire drills, disease prevention, landscape improvement, exercises for health, and annual health checks.

Investigations into Incidents about Occupational Risks

Every month, MWA's internal units conduct safety checks based on safety forms. If flaws are detected, they shall specify how they will resolve the issues and when the resolution will be completed in the report on their monthly meetings. SHE committees shall supervise the process to report safety concerns. If employees notice any safety incident, they must report it in compliance with the process. SHE committees shall also oversee accident-reporting process. Every MWA unit must report work-related accidents/illness (using Form Kor Por Chor Phor Sor Kor 001), which will be compiled for investigations. Results will then be submitted before the meetings of the committee on compensation payment.



MWA Work-related Accidents/Illness Form (Form Kor Por Chor Phor Sor Kor 001)

MWA has conducted safety training for employees every year. Some training courses are conducted in line with laws while some others offer specialized safety knowledge. For courses that are provided in compliance with laws, participants must take a post-test.

1. Courses in Compliance with Laws

- 1.1 SHE Course for General Workers/New Workers was provided in compliance with the Occupational Safety and Health Act B.E. 2554 for 516 new employees who had never received such training before;
- 1.2 Course for supervisory-level safety officers was provided to 122 employees who work as unit heads or equivalent;



- 1.3 Course for executive-level safety officers was provided to 39 employees who work as division directors or equivalent; and
- 1.4 Course for SHE committee members was provided to 37 SHE committee members.

2. Specialized Safety Courses

- 2.1 Course for permit grantors, supervisors, assistants, and officials carrying out works in confined spaces was provided to 38 employees who work in confined spaces; and
- 2.2 Overhead-Crane/Gantry Crane/Stationary Crane Operator Course for water production/water-delivery employees and relevant units was provided to nine employees.



Summary of Safety Records in Fiscal Year 2018 - 2020

	Fiscal Year		
	2018	2019	2020
Target: Injury Frequency Rate: I.F.R. no more than	0.40	0.39	0.24
Result: Injury Frequency Rate: I.F.R.	0.14	0.30	0.15
Target: Injury Severity Rate: I.S.R. no more than	3.18	3.18	3.18
Result: Injury Severity Rate: I.S.R.	0	0.15	0.59
Recordable work-related injuries			
- Number of injury/illness from work (leave no more than 3 days) (persons)	1	2	0
- Number of injury/illness from work (leave more than 3 days) (persons)	0	0	1
High-Consequence work-related injuries	0	0	0
Number of death(s) from work (persons)	0	0	0

Notes:

- Data-collection process calculates work hours from leave system, overtime payments, and shift hours. Based on the American National Standard Institute's criteria, it determines injury frequency rate (I.F.R.) and injury severity rate (I.S.R.). In fiscal year 2020, total work hours were 6,801,005.5 with one million as reference hours.
- **Recordable work-related injuries** refer to the number of employees taking no more than three days off because of work-related injuries, and the number of employees more than three days off because of work-related injuries.
- **High-consequence work-related injuries** refer to the number of employees taking more than six months off work because of a work-related injuries. It does not include work-related deaths (based on GRI 403-9 Work-related injuries).
- At present, WMA does not compile statistical data about work-related injuries of contracted workers systematically. It will be conducted in the fiscal year 2020.

In fiscal year 2020, one employee had a work-related accident and took four days off (11 - 14 February 2020). The accident happened while he was on duty. Tasked with reading water meters, he was riding his motorcycle on a frontage road under the Si Rat Expressway and near the Bang Bamru Station when a car suddenly cut in front. The employee applied brake in time. However, because the road was sandy, his motorcycle skidded and fell just like him. The accident broke his collarbone joint and dislodged his right shoulder. MWA units have formulated measures to control hazards and lower risks by providing training to staff and agents. An emphasis was placed on driving / motorcycle safety, with employees and agents instructed to steer their vehicle carefully, comply with traffic laws, and always put on a safety helmet.

At present, MWA has provided annual health checkup to its employees. Their checkup results are also used to analyze their illnesses alongside their treatment records, as well as the country's health trends and unhealthy behaviors. Analysis results

are usually used to educate staff for the purpose of reducing their illnesses. However, in fiscal year 2020, it was not possible to hold educational events/activities. MWA therefore just organized training on health issues. For example, a training course addressed the useful topic of "Change Your Lifestyle Today for Good Health Tomorrow" so as to address risks of diabetes. Another training focused on office syndrome by highlighting "Back Pain among Young Working People". Regarding work-related illnesses, MWA still lacks occupational-medicine specialists. It is therefore studying approach to recruit such specialists.



Health Support

MWA has implemented several health-promotion projects under Happy Workplace banner. For example, Happy Body activities have encouraged workouts for good health while Happy Relax has sought to ease participants' stress. There are educational visits to various units of MWA for interested employees too. MWA has even provided relaxing massage services to employees in hope of lessening office syndrome. Moreover, it has allocated a budget for MWA Employee Club's procurement of exercise equipment (for use at an internal gym). There are Sport Day as well. The Medical Services Division, furthermore, has analyzed employees' annual health checkup's results for planning projects to solve employees' health problems. For instance, after finding that blood cholesterol level of so many employees was above safe limits, the division launched the "Downsize Belly, Lower Health Risks" project. In regard to food hygiene, it has collaborated with the Lak Si District Office in evaluating sanitary practices at MWA canteens. Random check on food contaminants has also been done once a year.

In addition, MWA has offered medical benefits to employees, their spouse and immediate family members. For treatments at state hospitals, they can get reimbursements in line with regulations. If they seek outpatient care at a private hospital, they will be reimbursed for up to 3,600 baht a year. Such medical benefits do not cover workers who will have to exercise rights to medical care under the social security system.

MWA, moreover, has internal medical services. They cover medical diagnosis, treatments and counselling. Employees and their family members, retired employees, and workers can access the services namely medical services, dental services, pharmaceutical services, and clinical pathology. In events that their health conditions require more specialized services, they shall be referred to better-equipped medical facilities.

MWA's COVID-19 Response and Control Measures

MWA has introduced COVID-19 response and control measures in the wake of its outbreak. For example, MWA has procured temperature-monitoring devices and set up screening points at its entrances. Temperature checks have also been done at various corners across its facilities. People with the body temperature of over 37.3 degrees Celsius are not allowed to enter MWA facilities. In addition, MWA has implemented social distancing. Its staff are instructed to work from home or work at different work schedules so as to lower density at workplaces.

- 1 MWA has reviewed its emergency response plan, business continuity plan, and plans related to diseases every year. Relevant drills have also been conducted on a yearly basis in line with the MWA Announcement on Business Continuity Policy dated 4 October 2018. According to the announcement, MWA must prepare business continuity plan and emergency response plan. It also must review and communicate about the plans, on top of conducting relevant drills annually. These plans must be in line with MWA goals and strategies too.
- 2 MWA's COVID-19 response plan contains three parts as follows:



Part 1 Screenings of employees/workers/visitors prior to entry: Work units under MWA shall set up screening points outdoors or in highly-ventilated areas. At screening points, temperature checks are conducted for all staff/visitors.

Part 2 Surveys shall be conducted to identify staff who develop suspicious symptoms. Results are reported to the committee on safety, occupational health and work environment.

Part 3 Surveys shall be conducted to identify patients, their close contacts, and persons who should be investigated as parts of COVID-19 control, with findings reported to MWA's disease-investigation team for further actions

- 3 MWA has procured supplies for protection against COVID-19 such as surgical masks and hand sanitizers for staff. It has also sprayed disinfectant across its office buildings and has regularly cleaned its office space especially in areas used by a big number of people such as service counters, lifts, and canteens.
- 4 MWA has required its staff to strictly comply with international standard on disease control and applicable laws.
- 5 MWA has provided assistance to its staff, their family, and neighboring communities in regard to disease control and care for those who have contracted COVID-19.



Remedial Actions for People Affected by COVID-19 Outbreak

MWA introduced remedial actions to help people affected by COVID-19 outbreak and to ease the expenses of people living in Bangkok, Nonthaburi and Samut Prakan, which are its service areas. These remedial actions covered 2.4 million families or more than 12 million people, responding to the Ministry of Interior's policy to focus on "Raising People's Income, Lowering Their Expenses". Details were as follows:

- 1 Exemption of water-service suspension penalty between March and September 2020 in support of the "Stay Home to Stop (COVID-19), Save the Nation" campaign.
 - Users of no more than 10 cubic meters of water were exempted from water charges, monthly service fee and raw-water charges (May - July 2020);
 - Users of more than 10 cubic meters of water were exempted from the water charges for their first 10 used cubic meters of water and any additional cubic meter of used water was given a 20-percent discount (May - July 2020);
- 2 Extension of water-bill payment deadline for bills issued for May and June 2020. Hotels and housing-rent businesses were given a six-month interest-free instalment plan.
- 3 Water-meter deposits were returned to all water users.
- 4 Water-bill payment fees were waived (May - June 2020).



Moreover, MWA handed out 500 sets of rice, drinking water and food box to people living around its Bang Khen Water Treatment Plant at the multipurpose yard of Wat Lak Si School in Bangkok's Lak Si district so as to ease the woes of people who were affected by COVID-19 outbreak. Also, MWA provided training on how to fix water pipes and maintain waterworks systems at home.

**การประกาศหลวง
ปรับเพิ่มมาตรการ
เพิ่มรายได้ ลดรายจ่าย ให้ประชาชน**

- 1 ใช้น้ำฟรี 10 คิวแรก 3 เดือน ทุกครัวเรือน
- 2 ลดค่าน้ำประปา 20% 3 เดือน สำหรับผู้ใช้ น้ำเกิน 10 คิว/เดือน
- 3 ขยายระยะเวลาชำระค่าน้ำ สามารถผ่อนชำระ: ได้นานถึง 6 เดือน (กิจการโรงแรมและที่พัก)
- 4 คืนเงินประกันการใช้น้ำทุกราย

ประเภทผู้ใช้น้ำ	วันลงทะเบียน
บ้านพักอาศัย (R1)	1 พ.ค. 63
กิจการ ธุรกิจ (R2)	1 ก.ค. 63
- 5 ยกเว้นการตัดน้ำนาน 6 เดือน ถึง 30 ก.ย. 63
- 6 ขยายเวลางดเก็บค่าธรรมเนียมชำระค่าน้ำ 3 เดือน จนถึง 30 มิ.ย. 63 ที่

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Remedial Actions for Personnel Affected by COVID-19 Outbreak

MWA implemented the "We Fight COVID Together" project with aim to ease the woes of personnel affected by COVID-19 outbreak and measures to raise people's income and lower their expenses. A total of 2,778,000 baht was given to 116 wire-binding agents and water-charge collectors between March and September 2020.

Furthermore, MWA presented 30,000 baht in financial remedy to five workers (subcontracted workers) pursuant to the Cabinet resolution instructing state organization/enterprise to consider assisting personnel who have supported medical workers' operations because they are exposed to

COVID-19 risks and have shouldered additional travel/food expenses during their additional mission.

Moreover, MWA governor (Mr. Prinya Yamasamit), provided a fund in support of COVID-19 insurance for 497 water-meter reading agents, water-charge collection agents, and wire-binding agents working for MWA's 18 branches. Also, COVID-19 insurance was taken out for 241 security guards at MWA as they were in charge of checking the body temperature of visitors. Not only that this task was an additional task, but it also posed an extra risk to them.



Local Communities: Participation in Development of Communities and Society

Growing Up with Communities Sustainably

MWA has accorded importance to not just its business operations but also communities around its headquarters and branches. It has therefore implemented several projects to improve the quality of life and develop local communities. These projects cover natural-resource conservation,

waterworks improvement for communities, training on waterworks knowledge that is the field MWA has specialized in, and activities that bring MWA closer to communities and promote their unity on a sustainable basis.

“MWA Headwater Forest Conservation” Project (Integrated Sustainability Project)

This project has originated from the “MWA Headwater Forest Conservation in the Footsteps of HM King Bhumibol Adulyadej the Great (King Rama IX)” Project (2017 - 2019) in headwater forests of Nan province. Conducted through the collaboration of various agencies including the Royal Forest Department, the Department of National Parks, Wildlife and Plant Conservation, the River Basin Committee, the Electricity Generating Authority of Thailand (EGAT) and other relevant authorities, this project has planted trees and Vetiver Grass for forestation and forest rehabilitation. Also, it has built check dams in headwater forests, developed communities, and built a network of water, nature and environmental conservation across the Ping, Wang, Yom, Nan and

Mae Klong river basins. It has created a network of MWA employee volunteers for headwater forest conservation as well. Moreover, this project has improved the quality of life among students and local communities in hopes that they will achieve development, receive benefits and successfully restore moisture and abundance for forests in their hometown. This initiative aims to retain keep more water in forests during dry season, reduce flash-flood damages to community forests during rainy season, increase wildlife population and diversity, and contribute to the balanced and sustainable ecological system.



Operating Results in Fiscal Year 2020



MWA and EGAT signed a memorandum of understanding on water-resource conservation and rehabilitation Phase 3 so as to continue bilateral cooperation on the management, conservation, and rehabilitation of natural resources and environment;



A total of 162 check dams were built at an upstream forest of the Bhumibol Dam in Tak's Sam Ngao District between 14 and 16 February 2020 or during the first event under the project in fiscal year 2020; and



Because of COVID-19 situation, the project was unable to organize forestation and planned community-development activities.

Waterworks Profession for People Project

As a part of its CSR for public engagement in social/community development, MWA has implemented the Waterworks Profession for People Project. Under this initiative, participants receive training on basic skills related to waterworks professions and pipeline-system maintenance. Also, this project encourages the groupings of waterworks technicians with aim to encourage their exchange of knowledge through collaboration with MWA. Moreover, this project creates job opportunities for those interested in being freelancers and encourages their willingness to serve society and conserve water resources. Launched in fiscal year 2014, this project has been a big success. As the Waterworks Profession for People Project has won really good response, MWA has decided to continue it for sustainable success. In fiscal year 2020, the project provided both basic waterworks profession training and advanced waterworks profession training. In addition, the project organized activities for its participants to serve the public by applying skills they had received from the training. Willing



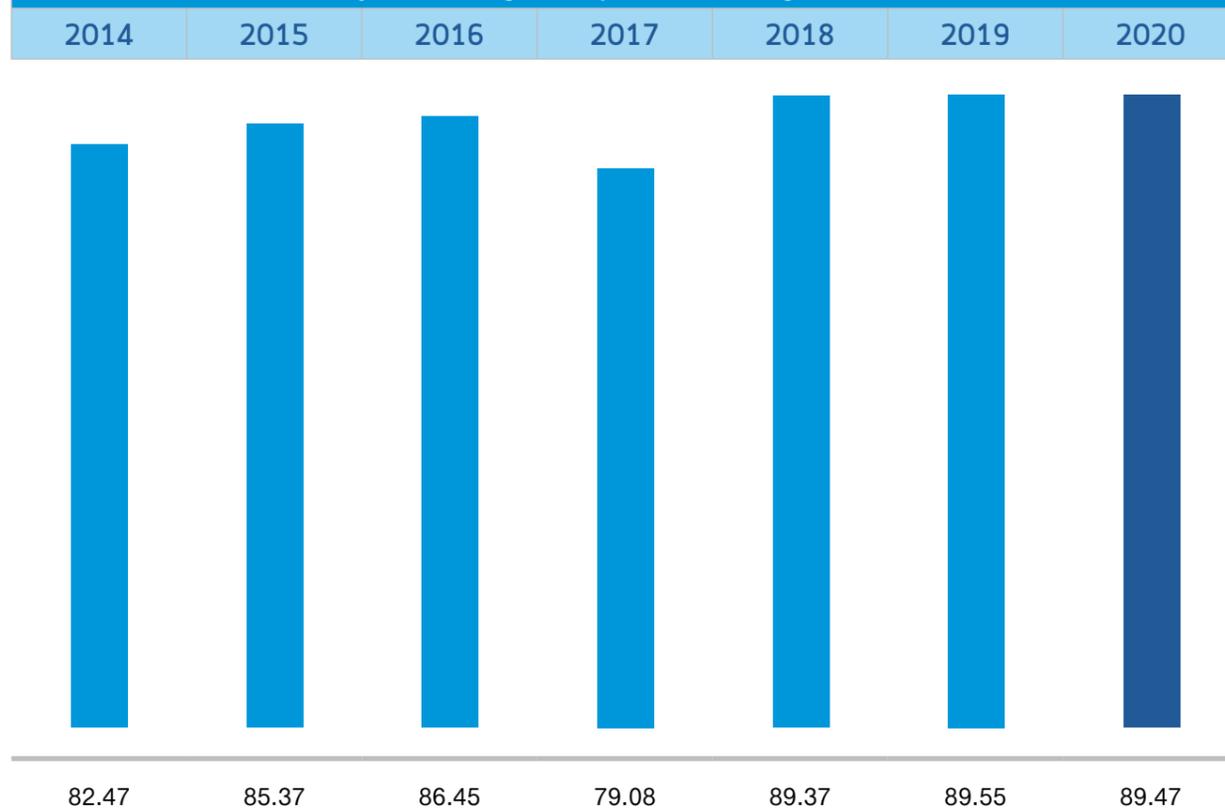
participants were brought to temples, schools and public places to provide basic waterworks maintenance under the project.

Operating Results

Number of Participants in Waterworks Professions for People Project

Fiscal Year	Number of Classes		Number of Participants (Persons)			Number of CSR activities (Times)
	Basic	Advance	Female	Male	Total	
2014	4	-	10	85	95	6 (9 Places)
2015	10	-	108	232	340	8 (12 Places)
2016	8	2	88	230	318	6 (8 Places)
2017	6	2	83	155	238	6 (7 Places)
2018	4	1	81	141	222	6
2019	2	1	32	54	86	4
2020	2	-	21	55	76	1
Total	36	6	423	952	1,375	37 (46 Places)

Survey on Training Participants' Knowledge Increase (%)



School Waterworks System Project

One of MWA key missions is to explore raw water sources so as to get raw water for its water production, delivery and distribution. MWA aims to ease the suffering and increase the happiness of people, and also to reduce inequalities for the purpose of ensuring inclusive and adequate access to clean, safe and quality tap water for everyone. MWA uses raw water from natural water sources (in Mae Klong and Chao Phraya river basins) for the production of quality water for more than two million families in Bangkok, Nonthaburi and Samut Prakan to consume. Moreover, MWA accords importance to people living upstream and thus conducts comprehensive CSR activities for them. Also, MWA pays attention to upstream and remote communities' lack of opportunities to have clean water for consumption. To address this problem, MWA launched the "School Waterworks System Project". Under this project, high-performance water-production systems are installed alongside standard waterworks management systems for communities that lack access to clean water. The project focuses on procuring/improving school waterworks system; developing groundwater system, water filtration system, water-pumping system,

and water pipeline system; procuring high tanks for rainwater/groundwater storage and ready-for-use gutters; and organizing activities that are useful to schools in the Mae Klong River basin. The installations aim at giving these communities good sanitation and better quality of life.



Operating Results in Fiscal Year 2020

MWA installed/improved waterworks system for the Wat Nong Chik School in Thung Luk Nok Sub-district, Kamphaeng Saen District, Nakhon Pathom province.



Safe and Quality Water Project (Water Storage Tank Wash)

MWA has implemented the Safe and Quality Water Project by publicizing knowledge of its water safety plan for drought period, the need to wash water storage tanks, and how to wash them. Target groups are students at state/private schools in MWA service areas. In fiscal year 2020, the project delivered knowledge to three schools namely:



Horwang School

in Bangkok's Chatuchak District
(22 June 2020)



Watkhemapiratarom School

in Nonthaburi's Mueang District
(7 August 2020)



Samutprakan School

in Samut Prakan's Mueang District
(10 August 2020)

In addition, the washed water storage tanks project at 63 locations during the year happened at:

Seven schools in Nonthaburi's six districts

50 schools in Bangkok's 50 districts

Six schools in Samut Prakan's six district

Stakeholder Day: Engagement for Sustainability

Stakeholder Day is held to create a forum for communications and the promotion of mutual understanding among all groups of MWA stakeholders. The forum also encourages the exchanges of opinions and the giving of recommendations, as MWA seeks to explain its key work plans. MWA organizes its Stakeholder Day with aim to foster cooperation in support of its operations and pursuit of its goals to respond to the needs of stakeholders across all sectors in a balanced manner, to fulfill their expectations, and to improve waterworks-management efficiency.

In fiscal year 2020, MWA's Stakeholder Day embraced the theme of Engagement for Sustainability. Held at Centra by Centara at the Government Complex Hotel & Convention Centre Chaeng Watthana, the event featured an MWA exhibition, Deputy Interior Minister Nipon Bunyamanee's special lecture on "Public Service for Sustainable Life Development", a seminar on "4 Steps for People's Sustainable Happiness", and a focus-group discussion on corporate sustainability topics. There were 458 participants in the event. Via a survey, participants in the event gave a satisfaction score of 4.18 for MWA operations.



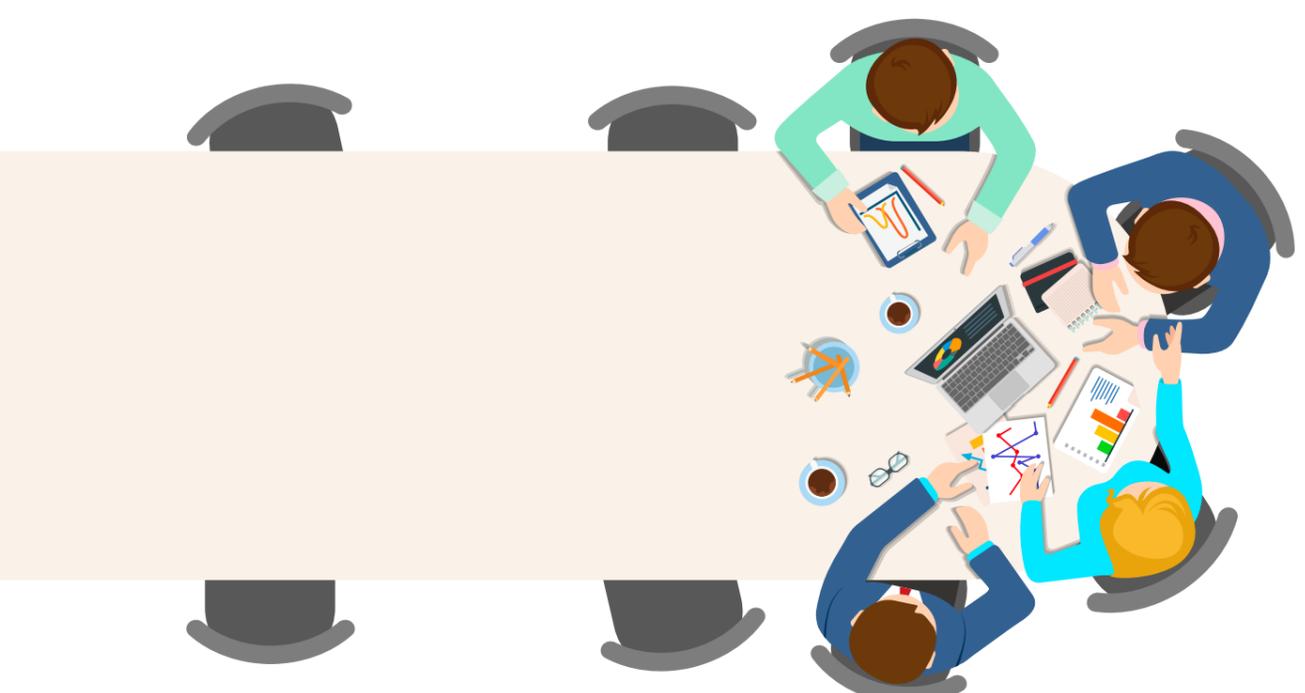
Training and Education

MWA has always accorded importance to its personnel development in terms of knowledge, abilities, and skills so as to equip its personnel with expertise in various fields. Also, it has encouraged its staff to develop new abilities, innovate, and leverage technologies for the development of efficient work process. Training and education have been provided to personnel because human resources are key driving force for MWA's pursuit of its goals and contributes to its sustainable growth.

Employee Potential Development Project

In 2020, MWA's human-resource development pursued the goal of preparing staff for changes and Thailand 4.0. In pursuit to this goal, MWA focused on equipping its staff with knowledge, abilities, multi skills, and commitment to their job. Staff were also trained about digital technologies for higher work efficiency. MWA also promoted self-learning and self-improvement among its staff so that they could drive their organization in line

with its vision, missions, corporate value and the goal of becoming a high-performance organization. MWA arranged training to equip its staff/executives with essential skills and capabilities in accordance with its annual training plan, HR Strategy Map, and the 5th MWA State Enterprise Plan (2.3-1L: Personnel Development Project for Efficient Strategy Implementation).



Report on Employees' Average Training Hours as Categorized by Employee Level in Fiscal Year 2020

Total Employees

Level	Total
10 or higher	12
9	33
8	91
7	482
6	817
5	1,282
4	833
3	480
2	292
1	21

Average Training Hours per Person

Level	Average Total
10 or higher	467.94
9	539.74
8	456.17
7	154.75
6	105.11
5	61.60
4	52.32
3	38.98
2	38.73
1	32.95

Male
2,504 Persons

Female
1,839 Persons

Total
4,343
Persons

Average Male
180.27 Hours

Average Female
209.93 Hours

Average Total
194.83
Hours

Vocational Courses

1. Courses in Water Safety Plan (WSP)

MWA conducted WSP-related courses in line with the annual training plan for fiscal year 2020 as follows:



- 1) Course in “WSP Review” for WSP Core Team and relevant parties to ensure they have solid understanding of WSP in all stages of waterworks chain from raw-water system, to water-treatment system, and to water system at water users’ places, are able to assess water-quality risks, and develop MWA’s WSP;
- 2) Course in “Water-Transmission Canal Monitoring” for staff and subcontracted workers under Deputy Governor (Water Production and Transmission) so as to ensure that they know the principle, framework, mechanisms, roles and stability risk-management process of raw-water pumping system; and
- 3) E-learning Course on WSP was prepared for staff and workers so as to ensure they have basic knowledge of WSP and the World Health Organization’s standard on water quality. With such knowledge, they can ensure every process is safe and in line with international standards.

2. Course in Water Loss Management

MWA conducted water-loss reduction training across four groups in fiscal year 2020 as follows:



Group 1: Knowledge of How to Reduce Technical Water Loss (A1-A3)

- 1.1) Basic Training on Water Loss Reduction and Basic Leak-Identification Pipe Survey (A1) was designed to equip staff with basic knowledge of how to reduce water loss and conduct leak-identification surveys. Its content can be applied to water-loss-reduction missions in general;
- 1.2) Training on Advanced Leak-Identification Pipe Survey (A2) was designed to train staff about advanced leak-identification surveys and modern tools/technologies for such surveys; and
- 1.3) Advanced Training on Water Loss Management (A3) was designed to give staff knowledge of area-based water-loss management and related in-depth knowledge.

Group 2: Reduction of Apparent Losses (B1)

Training on reduction of apparent loss from malfunctioning water meters (B1) was designed to educate staff about the relationship between apparent losses and MWA’s current and future water meters/related technologies such as electronic meters, smart meters, and automatic meter reading (AMR) system. The training also taught its participants about how to select the right type and size of water meters.

Group 3: Design of Water Pipe Constructions, Installations and Repair Process for Water-Loss Reduction (C1)

This design training addressed the supervision and management of contracts on water pipe constructions, installations, and repair process for water-loss (C1). This training aimed to educate participants about how to reduce water loss during the supervision of the constructions/installation of water pipes. Participants were also taught about the Construction Supervision Manual 2019. Supervisors of such works thus got supervisory techniques.

Group 4: Information Management for Water-Loss Reduction (D1-D5)

- 4.1) This training on IT system for water-loss reduction (D1) aimed to boost its participants’ skills and knowledge for the management of field activities related to water-loss management based on WLMA system. Its content focused on the analyses/application of data from WLMA, GIS and CIS systems as well as on data-registry in the systems. Settings can be configured on an area-based basis for proper monitoring to ensure water-loss reduction;
- 4.2) This basic training on EPANET program (D2) was designed to educate employees about hydraulic models, and EPANET program. Participants were also taught about how to apply the program for analyses and water-loss management;
- 4.3) This advanced training on EPANET program (D3) was designed to teach employees about hydraulic models, EPANET program, how to apply them to water-pressure management, water-flow analyses, leak analyses, and other analyses for water-loss management and improvement of water-pipe network;
- 4.4) This training on system usage and selection of pipeline for improvement based on Asset Management (D4) was designed to give the knowledge of Asset Management system and the selection of pipeline for improvement to participants. At the end of the training, participants were expected to have higher capabilities in reducing water loss during water-pipeline installations, monitoring works, and conducting preliminary analyses of water-pipeline improvements; and
- 4.5) This advanced training on AutoCAD (D5) aimed to make its participants understand the benefits/functions of AutoCAD especially in regard to 3D Model and MWA water-pipeline installations.

MWA has educated and developed its personnel to ensure that they can efficiently drive its strategies. Moreover, MWA has accorded importance to the inculcation of public-mindedness in executives, employees, and workers so as to foster their commitment to social responsibility. The inculcation was done via **Training on ISO 26000 : Social Responsibility Standard**. Providing the guidance on social and environmental responsibility or CSR in Process, this training aimed to ensure MWA solidly works towards sustainability through operations that are oriented towards economic growth, social well-being, resource efficiency and environmental protection. Also, MWA organized a talk on **“How to Conduct CSR for MWA’s Sustainability”** at MWA CSR DAY 2020. Speaker was Dr. Nattakit Tangpoonsinthana, who sat on MWA Board of Directors and chaired the MWA Subcommittee on Corporate Governance (CG) and Corporate Social Responsibility (CSR). During the talk, he shared his views and experiences so as to enrich the experiences of his audience especially in regard to social responsibility and to explore guidance towards tangible solutions, which will lead to sustainable development. Participants had the awareness score of 90 and 94.23 for the training and the talk respectively.

Educational Leave with MWA Scholarship

In fiscal year 2020, the Human Resources Department implemented the human resource development plan and granted a scholarship to an employee who pursued a master’s degree in the field of water resources engineering at the Chulalongkorn University’s Faculty of Engineering. In addition, MWA approved the educational leave for three employees in support of their opportunities to receive graduate/doctorate studies in Thailand and overseas in hopes that they would get additional knowledge and skills for their organization’s further development. In fiscal year 2020, three employees took the educational leave for doctorate studies. Of them, one studied in Thailand while two others studied overseas.



Employee Competency Evaluation

MWA evaluated employee competency in many areas for the purpose of studying, reviewing and analyzing employee competency for the formulation of plans to increase employees' knowledge and skills, and raising the potential of MWA as well as its staff. There were 3 types of evaluations as follows:



Core Competency: CC



Functional Competency: FC



Leadership Competency: LC

Employee Competency Evaluation in Fiscal Year 2020

Core Competency: CC

Level	Gender				Total	
	Male		Female		Person	%
	Person	%	Person	%		
Levels 6 - 10: Supervisory Positions	440	48.94	459	51.06	899	100.00
Levels 6 - 10: Equivalent	222	41.57	312	58.43	534	100.00
Levels 1 - 5	1,795	63.29	1,041	36.71	2,836	100.00
Total	2,457	57.55	1,812	42.45	4,269	100.00

Functional Competency: FC

Level	Gender				Total	
	Male		Female		Person	%
	Person	%	Person	%		
Levels 6 - 10: Supervisory Positions	440	49.11	456	50.89	896	100.00
Levels 6 - 10: Equivalent	214	40.92	309	59.08	523	100.00
Levels 1 - 5	1,780	63.87	1,007	36.13	2,787	100.00
Total	2,434	57.87	1,772	42.13	4,206	100.00

Percentage of employees being evaluated based on leadership competency (LC)

Level	Gender				Total	
	Male		Female		Person	%
	Person	%	Person	%		
Levels 6 - 10: Supervisory Positions	440	49.11	456	50.89	896	100.00
Levels 6 - 10: Equivalent	13	36.11	23	63.89	36	100.00
Total	453	48.61	479	51.39	932	100.00

Note: The number of employees calculated in each table was based on the actual size of workforce at the time each calculation was done. Calculations took place at different times based on MWA's evaluation schedule. Tables FC and LC used data as of 1 January 2020. Table CC, meanwhile, used data as of 1 June 2020. Their total numbers of employees therefore were different from Disclosure 102-7.

Overall Competency Evaluation in 2020

Item	2018	2019	% High-Low	2020	% High-Low
CC	99.54	99.64	0.01	99.79	0.15
FC	97.72	97.07	-0.65	98.10	1.03
LC	99.45	98.92	-0.53	99.68	0.76

In addition, MWA implemented the project to prepare human resources development plans in support of employees' sustainable career path and career advancement based on their potential and readiness.

Employee Benefits and Welfare

Because employees at all levels are key driving force behind MWA's secure progress, MWA has formulated policies to provide comprehensive benefits and welfare to employees so that they work happily and prosper alongside the organization.



Benefits and Welfare

- 1 Bonus
- 2 Tap-Water Fee Allowance
- 3 Overtime Pay
- 4 Overtime Food Allowance
- 5 Special Allowance for Staff on Work Shifts (Shift Premium)



- 6 Performance Reward (Intensive)
- 7 Flat-Rate Travel Allowance
- 8 Work-Related Driving Fee
- 9 Child-Support Benefits
- 10 Childbirth Benefits
- 11 Death Benefits (Funeral Support)
- 12 Funeral Co-Hosting Fee (Money to Support Religious Rites)
- 13 Disaster-Related Compensation
- 14 Financial Support for Children's Education (Children's Tuition Fee Help)
- 15 Scholarships for Workers' Children (MWA Scholarships)
- 16 Grants from Scholarships for Workers' Children Foundation
- 17 Welfare Housing Loans with Government Housing Bank
- 18 Welfare Housing Loans with Krungthai Bank
- 19 Compensation
- 20 Severance pay in event of layoff/dismissal without any fault
- 21 Nursing Services at MWA Medical Office
- 22 Medical benefits (when seeking external services)
- 23 Welfare Shuttle
- 24 Annual health checkup
- 25 Uniform
- 26 Housing for staff taking shifts at water treatment plants
- 27 Commemorative gift for staff completing 25 years of service
- 28 Certificate and commemorative gift for retirees
- 29 Certificate of honor for MWA contributors
- 30 Saffron robes conating
- 31 Professional Fees (for Holders of Specific Positions only)
- 32 Monetary retirement benefits are:
 - One-off retirement bonus / Provident fund
 - Performance rewards
 - Financial compensation for not using annual-leave days



For retiring employees, MWA has implemented plans and conducted activities to prepare them well both physically and mentally for quality retirement life.

In addition, MWA Labor Union was established to protect the welfare and benefits of employees, to monitor employment conditions and employee welfare, to accept complaints from employees and provide counseling to employees. Presently, 50 percent of employees are labor union's members. (disclosure 102-41)

MWA has accorded equal importance to its employees, provided welfare for mothers and their children, and supported family institution. MWA employees are entitled to childbirth and parental leave for the safety of both mothers and children. These benefits are provided to ensure that newborns will receive proper care from their parents in line with the Children's Rights and Business Principles of the United Nations International Children's Emergency Fund.

Records of Employees' Childbirth Leave and Return to Work during Fiscal Years 2018 - 2020

Leave Type/ Fiscal Year	Number of Employees Taking Leave	Number of Employees Returning to Work	Number of Employees Returning to Work in the Next Fiscal Year	Percentage of Employees Returning to Work	Retention Rate of Employees Returning to Work	Note
1. Childbirth Leave (Female)						
2018	63	38	25	100	100	
2019	53	44	9	100	100	
2020	50	38	12	100	98	One employee resigned (16 Sep 2020)
2. Parental Leave (Female)						
2018	-	-	-	-	-	
2019	2	-	2	100	100	
2020	3	2	1	100	100	
3. Paternity Leave						
2018	54	51	3	100	100	
2019	38	35	3	100	100	
2020	55	51	4	100	98.18	One employee resigned (1 Sep 2020)

Pre-Retirement

MWA has provided training to educate its employees about monetary benefits they will get upon retirement, related withholding taxes, payment schedule, the choice of keeping their money in provident-fund account, the choice of taking provident-fund money out in instalments, and advice on how to claim monetary retirement benefits with biggest tax savings. More than 90 percent of retiring employees have attended the training.



Retirement

- The payment of benefits from provident fund, one-off retirement bonus, performance rewards, and financial compensation for not using annual-leave days
- Advice on how to file personal income tax declarations (Por Ngor Dor 90, 91) related to the amount of money retiring employees have received upon retirement

MWA has set up the MWA One-Off Retirement Bonus Fund to guarantee that it will have enough fund to pay one-off retirement bonus to its retiring employees who are fund members. In support of the fund, MWA has done the followings:

- 1) It has submitted a monthly contribution equivalent to 10 percent of employees' salary at the end of each month pursuant to MWA Regulation on One-Off Retirement Bonus B.E. 2543
- 2) It has estimated future financial obligations for employee benefits to guarantee that it will have enough funds to pay one-off retirement bonus to its retirement employees, according to Financial Accounting Standard No. 19.

- **MWA One-Off Retirement Bonus Fund**
 - ▶ Contribution Percentage of Salary from Employees: 0% (employees do not have to pay contributions to the fund)
 - ▶ Contribution Percentage of Salary from Employer: 10% (equally)
- **MWA Employee Provident Fund**
 - ▶ Contribution Percentage of Salary from Employees: 3% - 15% (voluntary)
 - ▶ Contribution Percentage of Salary from Employer: 9% - 11% (based on years of service)



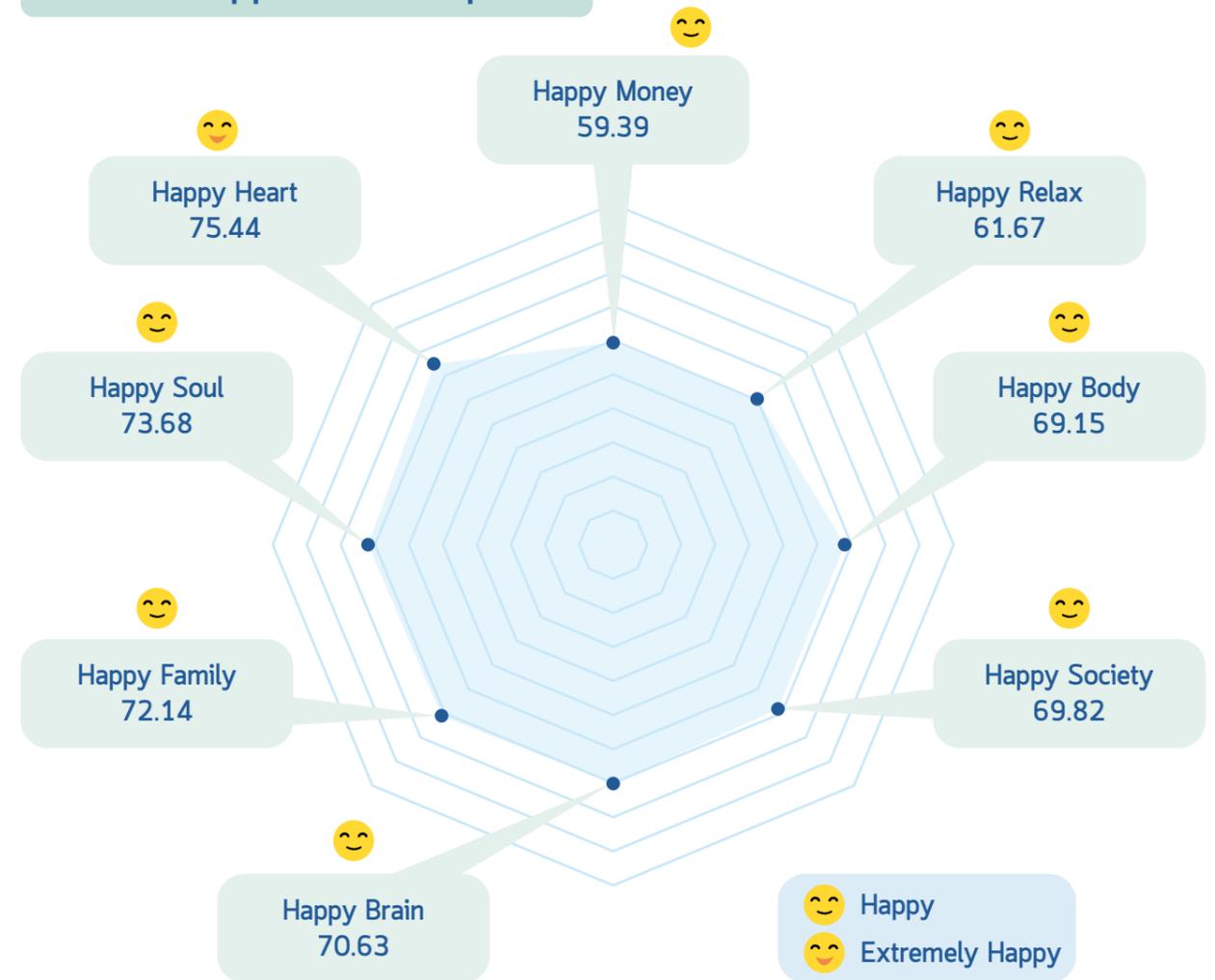
Happinometer of MWA Personnel

MWA conducted a Happinometer survey to determine the happiness level and needs of its employees in regard to its Happy Workplace Project, a part of HR Strategy Map. Happinometer (self-assessment of one's happiness) results are used to evaluate the output of happiness-creation activities that MWA has organized. MWA, moreover, has applied Organization of Happiness concept in checking the happiness and wellbeing of its personnel with aim to analyze their happiness and loyalty. All these efforts have reflected MWA executives' caring attention to staff as well as concerns, ties, and collaboration among MWA members at all levels. Happinometer results are used to plan activities in response to personnel needs for the ultimate goal of ensuring that staff can work happily and enjoy good quality of life, paving way for MWA to be an organization of happiness on a sustainable basis.

MWA Personnel's Happinometer Results in 2020



Overall Happiness (8 Aspects)



* MWA personnel's Happinometer results, covering 1,290 MWA members as of July 2020

Employee Engagement

MWA has implemented a project to survey employee engagement and satisfaction. In fiscal year 2020, a survey was conducted under the project to check/assess employee engagement and satisfaction, and review/audit key factors that influence the engagement and satisfaction among various groups of employees. This survey, moreover, served as a channel for MWA to listen to the voice of its personnel, their needs, expectations, and opinions on MWA human resource management and development. With the help of this survey, MWA has compiled a report on employee engagement. It showed in-depth analyses, including the relationships between employee engagement and

business output, and presented recommendations on how to efficiently manage/develop human resources, build employee engagement, and create employee satisfaction.

In fiscal year 2020, 5,538 of 5,981 MWA staff or 92.59 percent of MWA personnel answered the survey. Findings revealed that of 22 factors that could create employee engagement and satisfaction, 7 factors got “very satisfied” response. These 7 factors are job security; image and reputation of MWA; social responsibility, colleagues; sense of accomplishment; supervisors; and focus on customers. They ranked as 7 top factors just like in the 2019 survey.



1. Number of New Employees by Gender (Female)

Number of New Employees	Fiscal Year 2018			Fiscal Year 2019			Fiscal Year 2020		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
21-30 years old	14	10	24	48	38	86	32	39	71
31-40 years old	4	2	6	15	12	27	37	22	59
41-50 years old	-	-	-	1	2	3	7	3	10
51 years old up	-	-	-	-	-	-	-	-	-
Total	18	12	30	64	52	116	76	64	140

2. Number of Retired and Resigned Employees by Age and Gender (Age calculated as of 30 Sep 2020)

Age	Reason for Employment Termination	Fiscal Year 2018			Fiscal Year 2019			Fiscal Year 2020			Total
		Male	Female	Total	Male	Female	Total	Male	Female	Total	
21-30 years old	Resignation	4	1	5	5	4	9	2	-	2	16
	Resignation	4	8	12	7	5	12	4	4	8	32
31-40 years old	Dismissal with benefits (on ground of fault)	-	-	-	1	-	1	-	-	-	1
	Dismissal without benefits (on ground of fault)	-	-	-	2	-	2	-	-	-	2
	Resignation	1	2	3	2	1	3	-	2	2	8
41-50 years old	Dismissal with benefits (without fault)	-	-	-	-	1	1	-	-	-	1
	Dismissal with benefits (on ground of fault)	-	1	1	-	-	-	-	-	-	1
	Resignation	1	-	1	1	1	2	3	1	4	7
51 years old up	Dismissal with benefits (without fault)	1	1	2	1	-	1	1	-	1	4
	Dismissal without benefits (on ground of fault)	-	-	-	-	-	-	1	-	1	1
	Retirement	52	36	88	37	44	81	30	33	63	232
	Total	63	49	112	56	56	112	41	40	81	305

Environmental Performance



Water and Effluents

Water Source Management for Water Production

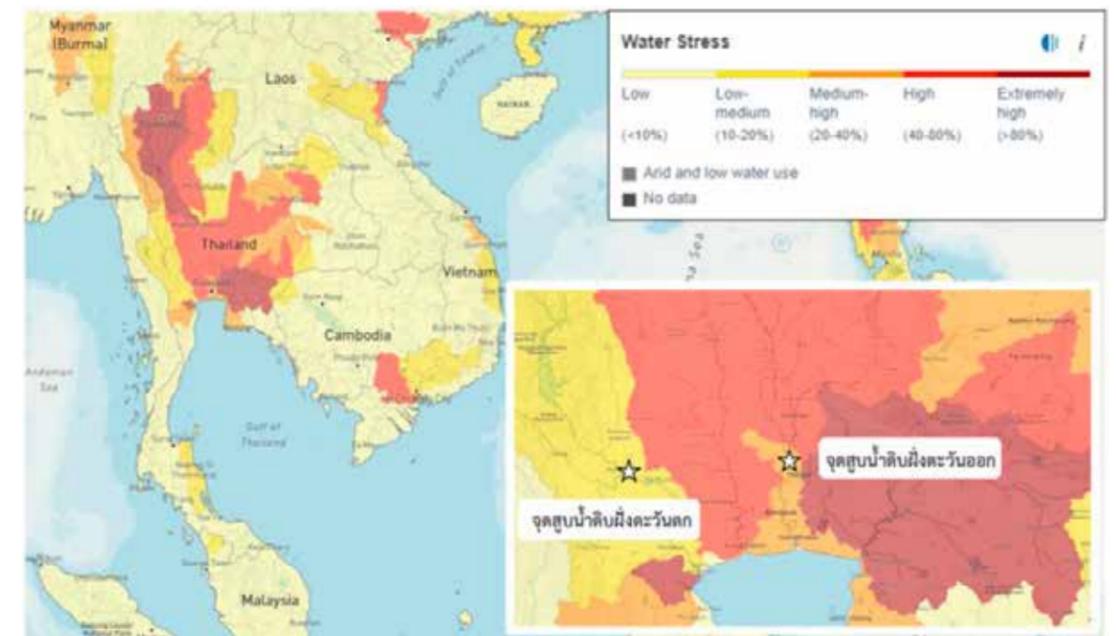
MWA has two major raw-water sources: the Chao Phraya River for water production on the eastern side and the Mae Klong River for water production on the western side. The amount of raw water used by MWA accounts for 9% and 4% respectively of the total disposable water volume of their upstream dams. MWA use of river water therefore does not significantly affect the availability of disposable water in upstream areas.

Eastern Side:

MWA takes raw water from the Chao Phraya River (the Bhumibol Dam, the Sirikit Dam, the Kwai Noi Bamrungdan Dam and the Pasak Jolasid Dam) for water production. In fiscal year 2020, the raw-water intake volume was approximately 1,694,761 megaliters. During the dry season or between November 2019 and April 2020, the Royal Irrigation Department allocated 900,000 megaliters of raw water to MWA's water-production facilities on the eastern side. The MWA's raw-water intake point on the eastern side is located in a water stress area with a medium to high risk*.

Western Side:

MWA takes raw water from the Mae Klong River (the Srinagarindra Dam and the Vajiralongkorn Dam) for water production. In fiscal year 2020, the raw-water intake volume was approximately 599,728 megaliters. During the dry season or between January and June 2020, the Royal Irrigation Department allocated 360,000 megaliters of raw water to MWA's water-production facilities on the western side. The MWA's raw-water intake point on the western side is located in a water stress area with a low to medium risk*



This image shows MWA's raw-water intake points on the World Resources Institute's (WRI) Water Stress Map: <https://www.wri.org/applications/aqueduct/water-risk-atlas/>

Water Volume from Various Water Sources

Raw Water Sources	Water Sources	Raw-water volume used for water production (megaliter)			% of total disposable water
		2018	2019	2020	
Chao Phraya River	Bhumibol Dam, Sirikit Dam, Kwai Noi Bamrungdan Dam, and Pasak Jolasid Dam	1,608,688	1,722,077	1,694,761**	9
Mae Klong River	Srinagarindra Dam and Vajiralongkorn Dam	533,891	558,109	599,728**	4

Notes:

* *Water Risk Atlas, the World Resources Institute (WRI) (2019)*

** *Both raw-water sources of MWA provide freshwater with Total Dissolved Solid (TDS) > 1,000 mg/L (In 2020, the TSD average of the eastern side was 294 mg/L while the TSD average of the western side was 112 mg/L.)*

Recognizing water resources' importance to agricultural sector, industrial sector, and household sector, MWA has formulated a guideline on efficient water management for waterworks. It has also collaborated with relevant authorities for systematic water resource management to facilitate the allocation of raw water for water production. In collaboration with the Office of the National Water Resources and the Royal Irrigation Department, MWA has laid down plans to handle water situation. MWA has also worked with the Royal Irrigation Department in monitoring salinity level of the Chao Phraya River throughout dry

season. MWA, moreover, has predicted the amount of raw water it will need for waterworks during the coming dry season. Its prediction is based on water usage volume, trend of growing demand across various sectors, and water-production plans that may be adjusted periodically. MWA has submitted its prediction to the Royal Irrigation Department every October for the latter to plan water discharges from the country's dams so as to ensure there is water in an appropriate amount, judging by existing water resources at the end of the rainy season, for waterworks as well as farms in each river basin.

Table Showing Allocation of Water in Chao Phraya and Mae Klong River Basins during 2019 - 2020 Dry Season (Unit: Megaliter)

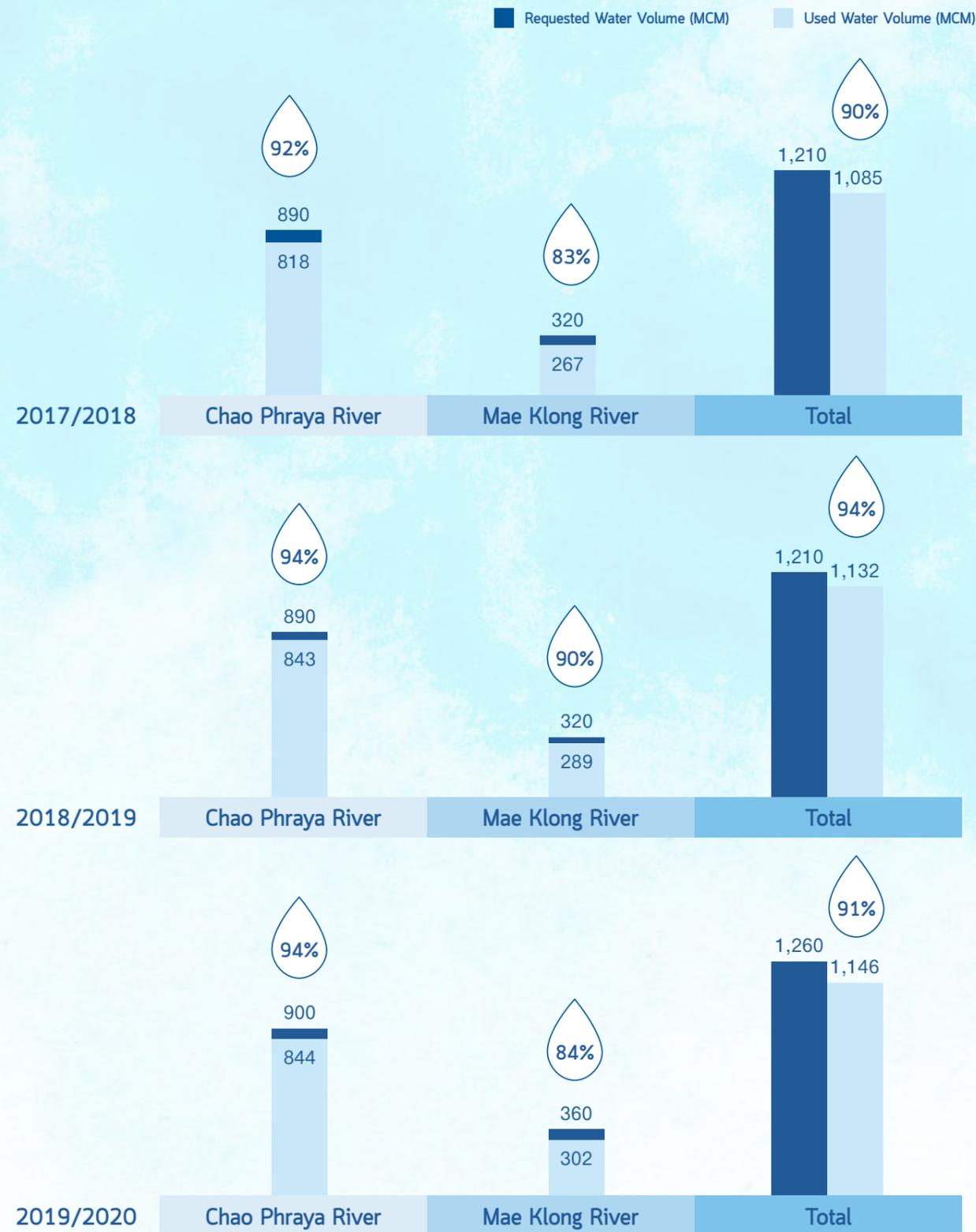
	2017/2018	2018/2019	2019/2020	%
Chao Phraya River				
Requested Water Volume	890,000	890,000	900,000	
Used Water Volume	818,000	843,000	844,000	94
Mae Klong River				
Requested Water Volume	320,000	320,000	360,000	
Used Water Volume	267,000	289,000	302,000	84
Total				
Requested Water Volume	1,210,000	1,210,000	1,260,000	
Used Water Volume	1,085,000	1,132,000	1,146,000	91

Notes:

6-Month-Long Dry Season on Western Side (Mae Klong River) between January and June

6-Month-Long Dry Season on Eastern Side (Chao Phraya River) between November and April in Next Year

Chart Showing Allocation of Water in Chao Phraya and Mae Klong River Basins during 2019 - 2020 Dry Season (Unit: Million Cubic Meters)



Notes:
 6-Month-Long Dry Season on Western Side (Mae Klong River) between January and June
 6-Month-Long Dry Season on Eastern Side (Chao Phraya River) between November and April in Next Year

Water Loss Management

As a state enterprise that produces and delivers clean and safe water to people in Bangkok, Nonthaburi and Samut Prakan, MWA has accorded importance to the reduction of water loss that occurs along pipelines from water-delivery pumping stations to water users' homes. At MWA, water-loss reduction has always been an important agenda. MWA constantly seeks to lower water loss through water-delivery system development and water-loss control to ensure highest efficiency and promote sustainable water efficiency. MWA has tackled water-loss issues via various projects including Water Pipeline Improvement Project (1978 - 1982), the Waterworks Improvement Master Plan No. 3 (1986 - 1991), and Waterworks System Improvement for Water Reduction Project (2002 - 2016).

In fiscal year 2020, MWA implemented the Water Loss Management Plan for Fiscal Years 2018 - 2022, which is in line with the MWA Strategy No. 5. Also,

MWA reviewed all water-loss management strategies so as to ensure they address both apparent losses, which refer to water lost as a result of management issues, and real losses, which refer to water that has leaked. Three main strategies in this area are Meter Management Strategy, District Metering Area (DMA) Management, and Strategy to Improve Damaged/Worn-Out Pipelines. Budget has been adjusted to properly finance each strategy. Target-area categorization has also been reviewed better to reflect the level of water loss in each area. namely:

- 1 Primary target areas of water-loss management;
- 2 Secondary target areas of water-loss management;
- 3 Target areas for improved water-loss management efficiency.

Operating Results in Fiscal Year 2018 - 2020

Water Distribution Volume (megaliters)

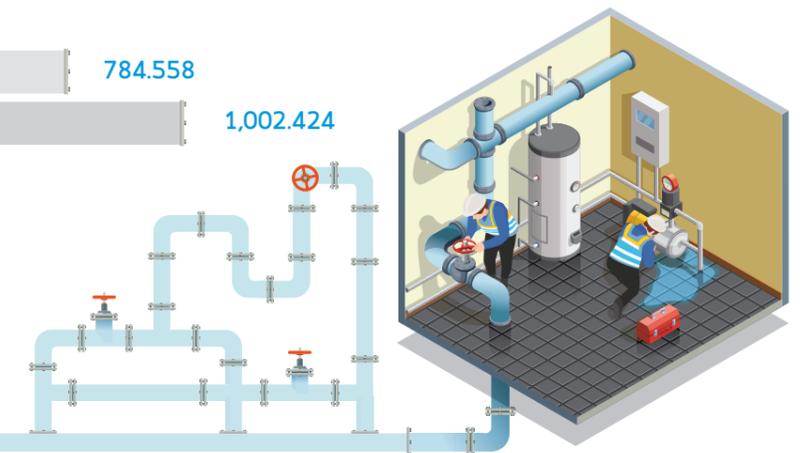
2018	1,997,100
2019	2,075,200
2020	2,121,100

Accumulated Water Loss Volume (%)

2018	29.83
2019	29.29
2020	31.25

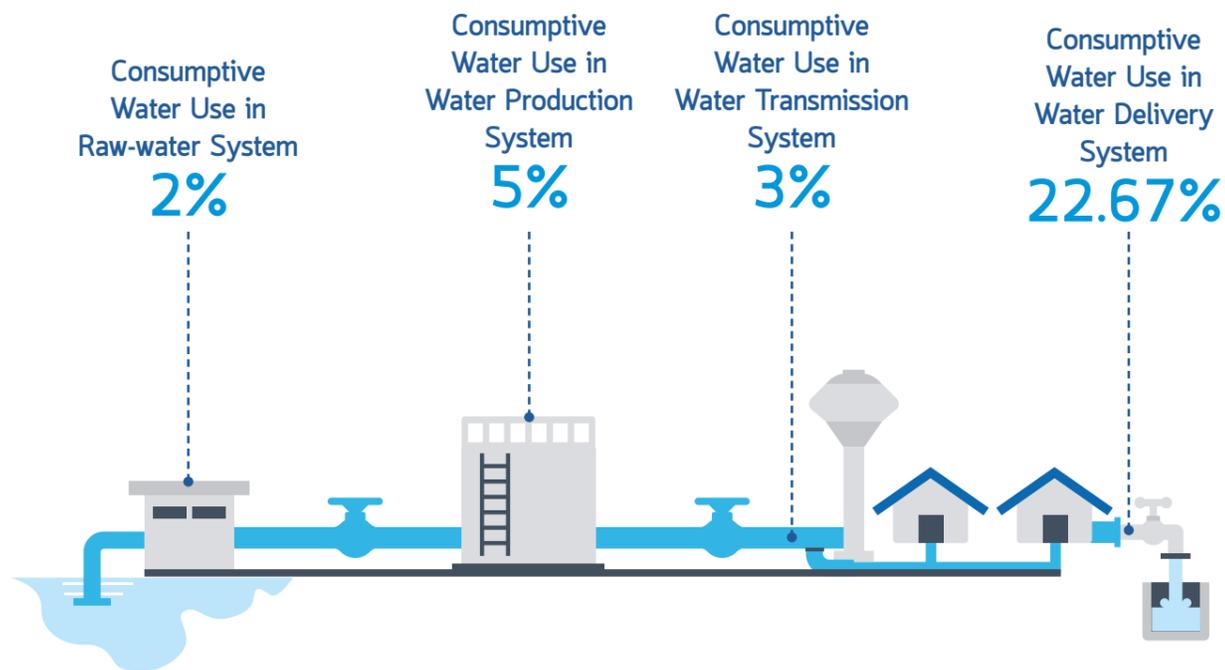
Operating Results: Repair for Worn-Out/Damaged Pipes (KM)

2018	407.11
2019	784.558
2020	1,002.424



Eco-Efficiency

MWA has studied and assessed its eco-efficiency between 2018 and 2019, aiming to set eco-efficiency standards and pursue improvement. Calibrated are water-loss rates listed in Design Criteria, accuracy rates of calibrators, and economic Level of Leakage based on 2019 records. Comparison results are used in assessing Consumptive Water Use in each system. Assessments then provide grounds of reference eco-efficiency figures. Indirect Water Use is not taken into account in eco-efficiency calculation, given that its volume is deficient low in comparison with Consumptive Water Use. Summary is as follows:



The above figures are reverse-calculated against one cubic meter of water sold in determining consumptive water use in each system. Indirect water use is not taken into account.

Between fiscal years 2016 and 2020, MWA has calculated eco-efficiency values with water footprint (Blue Water only) reflecting environmental impacts and water sales reflecting the value of products/services. Calculations are done based on the following formula:

$$\text{Eco-efficiency rate} = \frac{\text{Water Sales}}{\text{Water Footprint}}$$

Water footprint is assessed based on ISO14040 Environmental Management Water Footprint – Principle, Requirements and Guidelines, which focuses on Consumptive Water Use (CWU) in MWA’s Cradle-to-Gate water-production process endorsed based on MWA criteria. The eco-efficiency values during fiscal years 2016 - 2020 are as follows:

Analysis on Consumptive Water Use in Fiscal Years 2016 - 2020

Item	Water Volume (megaliters)				
	2016	2017	2018	2019	2020
1. Direct Consumptive Water Use*					
Raw Water System	24,741	25,531	23,135	27,146	26,634
Water Production System	86,950	95,561	77,380	121,635	94,952
Water Transmission System	59,130	44,418	45,643	54,603	54,320
Water Delivery System	599,694	655,006	595,026	606,555	662,000
Total Direct Consumptive Water Use	730,514	820,516	741,184	809,938	837,546
2. Indirect Water Use**	2,561	2,899	2,412	2,773	2,791
3. Consumptive Water Use	733,075	823,415	743,595	812,711	840,337
4. Sold Water Volume	1,406,251	1,408,557	1,401,387	1,467,406	1,458,289
5. Eco-Efficiency Rate (5) - (4) (3)	1.918291	1.710629	1.884609	1.805570	1.735363
6. Factor Value	Eco-efficiency value used as reference (average during fiscal years 2016 - 2018) 1.833052			0.98500	0.94671
7. Water Loss Volume (%)	28.47	31.75	29.83	29.29	31.25

Analyses suggest MWA should be able to raise its eco-efficiency. However, eco-efficiency improvement in regards to the reduction of Consumptive Water Use depends quite significantly on external factors. In water production system, the volume of water used to discharge sediments and backwash in particular depends on raw-water quality. During the past one to two fiscal year(s), aquatic seeds have blocked filtered ponds often. Water volume for backwash thus increases.

Regarding water transmission system and water delivery system, much of consumptive water use

volume is a result of water leaks that MWA should be able to address and solve in a tangibly manner. In its initial stage, MWA’s eco-efficiency improvement therefore will focus on water-loss reduction in water delivery system. In the meantime, MWA will gather data of consumptive water use volumes by water treatment plant for a comparative study and planning eco-efficiency improvement plans for the next stage. MWA is expected to be able to curb consumptive water use in all its systems, namely raw-water system, water production system, water transmission system and water delivery system.

“Sharp Eyes for Water-Loss Reduction” Project

MWA produces quality water for public consumption with water delivered to people via water-pipeline system. However, such system faces a major problem of water loss that occurs during water delivery from pumping stations to people’s homes. The management of water loss caused by leaking pipelines has three main components: awareness of leaks; leaking-spot identification, and repair. While the awareness of leaks is so important, it often takes a long time before MWA finds out about a leak. Given that MWA’s water-pipeline networks have a combined stretch of 36,000 kilometers, it takes much manpower to monitor and inspect the whole system. Even with personnel prepared for the purpose, tackling water loss from leaking pipes is complicated given that no one knows when and where a leak will take place. In many cases, a leak happens just after an inspection was already completed in its area. It will then take a long time for the team to come back to reinspect. MWA therefore finds it important that people who notice a leaking pipe alerts it via Hotline 1125. Also, MWA recognizes that the Bangkok Metropolitan Administration (BMA) too can help with pipeline monitoring. BMA road sweepers, after all, are out in action every day and operate throughout the capital. In addition, as BMA regularly dredges its water-drainage pipes, its staff may be able to help with leak detection. Water from MWA leaking pipes mainly drains into BMA’s water-drainage system. The volume of water there thus is an indicator for leak detection.



Recognizing these facts, MWA launched the “Sharp Eyes for Water-Loss Reduction” in collaboration with BMA. On 5 August 2020, MWA and BMA signed a memorandum of understanding on the project so as to integrate efforts for efficient water-loss management. Under this initiative, MWA has conducted training for BMA officials/workers tasked with waste collection, road sweeping, water drainage, gardening and other relevant tasks in all 50 districts of Bangkok. Furthermore, MWA has created a direct communication channel for BMA to provide quick alerts. MWA then is able to fast fix the leak and enhance water-loss reduction. Such efforts promise to curb the volume of wasted water, to reduce adverse water-loss impacts on people, and to enable efficient water efficiency.

Operating Results in Fiscal Year 2020

The Work Panel on “Sharp Eyes for Water-Loss Reduction Project” was established under the MWA Order No. 515/2563 dated 20 August 2020. This panel has the duty and power to formulate work plans, forms of activities, budget, and implementation for the project.

Up to 2,280 officials/workers joined the project. These project members alerted MWA about 161 leak spots in 35 districts of Bangkok (data collected between 5 August and 15 September 2020).



Water Efficiency Label Project

MWA has implemented the “Water Efficiency Label Project” with aim to encourage manufacturers’ /business operators’ import and development of water-saving innovations as well as to promote water-efficiency awareness among Thais. For this project, MWA conducted studies to lay down water-efficiency requirements for products to be certified by its label. MWA’s water-efficiency standard has many levels to reflect the different levels of water efficiency among certified water-saving products. In fiscal year 2020, the Water Efficiency Label Project awarded its label to four companies for 10 product models across three product categories namely (1) water-saving bathroom sink faucets; (2) water-saving kitchen sink faucets; and (3) water-saving showers.

Water-efficiency labels have three categories: Level 3, Level 4 and Level 5 so as to give consumers more alternatives. Consumers can thus choose what suits their needs the most as follows:

- Level 5 means excellent in water saving.
- Level 4 means very good in water saving.
- Level 3 means good in water saving.

During fiscal years 2018 to 2020, MWA has already awarded water-efficiency labels to 23 product models as follows:

- Fiscal year 2018: 8 product models
- Fiscal year 2019: 5 product models
- Fiscal year 2020: 10 product models

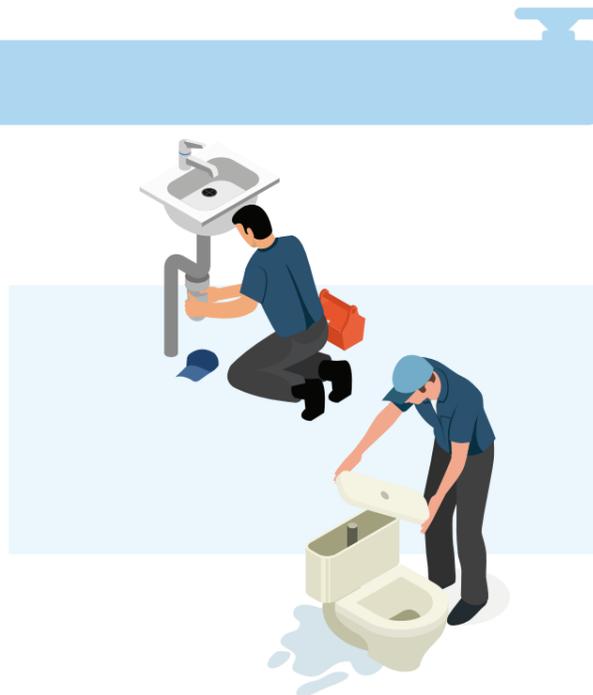
Moreover, MWA has campaigned for water efficiency, water resources conservation, environmental care, water-loss reduction, and water-saving equipment among government agencies, state enterprises, and importantly among the public via families, temples and schools. Model organizations have been chosen. Following the selection, their sink faucets have been replaced with products certified as water-efficient by MWA under the Families, Temples, Schools: Beginning of Sustainable Development project Year 3. In all, there were 12 model organizations in this project. In addition, MWA has already replaced 571 faucets at its facilities with products certified by its water-efficiency labels. Not only that the move has reinvigorated MWA corporate image as a water-resources guardian, but it has also boosted stakeholders’ confidence in water-saving products.



Grey Water Recycling System

MWA has implemented the Water Efficiency Technology Promotion Project. Under this project, Grey Water invention is upgraded for greater efficiency and greater ease of use through MWA collaboration with the Expert Center of Innovative Industrial Robotics and Automation. Working under the Thailand Institute of Scientific and Technological Research, this center has experiences in the development of water treatment/disinfection. It is therefore commissioned to design and improve Grey Water Recycling System for MWA.

Used water from sinks is filtered to separate particles or nutrients of bacteria from water. After being filtered, water is disinfected with chlorine/bromine-based disinfectant. It is then used for flushing toilets. The Grey Water Recycling System shows the amount of water saved each time and the total amount of water saved. The display of such information aims at raising water users' awareness of water-efficiency efforts. MWA has already installed six sets of Grey Water Recycling System at five of its facilities. Though being prototypes, these sets have really been used in restrooms so as to determine their stability and durability. Real usage promises to reveal how each function of the system works in heavy-duty mode. Data collection over about four months, or between November 2019 and March 2020, shows these sets helped MWA save 6,620 liters of water. On average, MWA could save about 1,655 liters of water per month thanks to the Grey Water Recycling System. MWA therefore had planned to upgrade the system further by reviewing and removing its existing weaknesses in the latter half of fiscal year 2020 (from April to September 2020). For the planned upgrade, MWA gave a research grant to the Thailand Institute of Scientific and Technological Research's Expert Center of

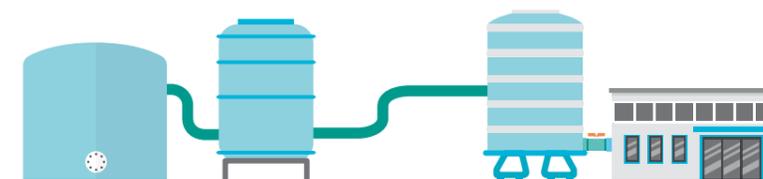


Innovative Industrial Robotics and Automation. The research is expected to make the Grey Water Recycling System more stable, more durable, and more efficient for heavy duty. During the period, MWA also surveyed its facilities to identify proper locations for the installation of additional sets.

Effluents and Waste

Wastewater Management

MWA has implemented wastewater-management guideline that complies with standard and laws related to wastewater control*. Wastewater at MWA can be divided into 2 groups:



Wastewater from Water-Production Process

Wastewater from water-production process mainly comes from sedimentation and filtration. Key parameter used before wastewater discharge is that all suspended solids must be removed. MWA has treated its wastewater with sediment-removal system so as to ensure the treated wastewater complies with applicable standard before its discharge into public waterways. Samples of wastewater are randomly collected at the frequency specified by laws, with the results of sample tests submitted to regulators on a regular basis.

Wastewater from Office Buildings

It is directed into on-site wastewater treatment systems. MWA office buildings do not discharge wastewater out of their compounds. As for wastewater that may be contaminated with hazardous chemicals that were used at water-quality labs for water production system, it is stored for proper disposal.

Table Showing Wastewater Discharges from MWA's 4 Water Treatment Plants

Water Treatment Plants	Total Wastewater Discharge Volume in Each Fiscal Year (megaliters)			Wastewater-receiving Points	Types of Wastewater Discharge	Standard
	2018	2019	2020			
1. Bang Khen	16,647	29,061	40,538	Bang Talat Canal	Freshwater	Passed
2. Sam Sen	5,561	6,596	10,856	Sam Sen Canal	Freshwater	Passed
3. Thonburi	2,428	4,411	2,938	Bang Khun Non Canal	Freshwater	Passed
4. Mahasawat	8,255	8,313	8,138	Plai Bang Canal	Freshwater	Passed

Notes:

1. Freshwater means water with total dissolved solids (TDS) below 1,000 mg/L.
 2. Wastewater discharged by MWA all flows to freshwater sources that sit in water stress areas with medium to high risks (Map shown on P. 113).
- * • The Ministry of Natural Resources and Environment's Announcement on Formulation of Standards to Control Wastewater Discharge from Industrial Plants, Industrial Estates, and Industrial Zones, which was announced on 29 March 2016 and promulgated in the Royal Gazette, Page 17, Volume 133, Special Chapter 129 Ngor on 6 June 2016.
- The Ministry of Industry's Announcement on Formulation of Standards to Control Wastewater Discharge from Industrial Plants B.E. 2560, announced on 30 May 2017 and promulgated in the Royal Gazette, Page 11, Vol. 134, Special Chapter 153 Ngor, on 7 June 2017.
- Ministerial Regulation on Criteria, Methods, and Forms for Statistical Data Collection, Records, and Summary Report on Wastewater Treatment System B.E. 2555, which was announced on 3 April 2012 and promulgated in the Royal Gazette, Page 4, Vol. 129, Chapter 39 on 4 May 2012.

Water Reuse at Mahasawat Water Treatment Plant's Production Process

All sectors have placed an emphasis on water resources management. As MWA recognizes the importance of water efficiency, its Mahasawat Water Treatment Plant is designed to reuse water from its production process during normal turbidity time. The volume of reused water in fiscal year 2020 is shown in the following table:

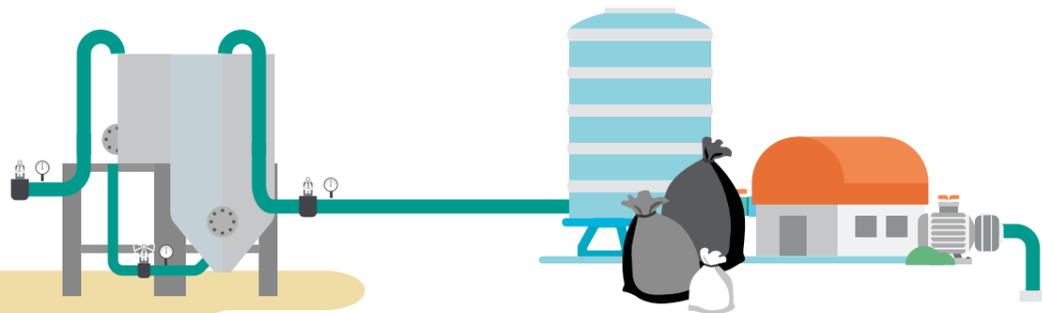
Fiscal Year	Reused Water Volume (Megaliters)
2018	5,463
2019	5,918
2020	5,646

Volume of Reused Water in Fiscal Years 2017 - 2020 at the Mahasawat Water Treatment Plant (Unit: Megaliters)

Fiscal Year	Month												Total
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
2017	627	583	570	532	458	572	528	548	552	581	541	320	6,412
2018	532	509	525	528	475	479	444	246	329	493	448	455	5,463
2019	484	463	545	504	389	468	480	516	482	562	551	472	5,916
2020	430	420	475	444	397	497	504	569	493	466	497	455	5,647

MWA Waste Management

At MWA, waste is divided into two categories namely:



Waste from Water-Production Process

It refers to sediments arising during water production process. Such waste is managed in compliance with law (The Ministry of Industry's Announcement on Disposal of Waste or No-Longer-Used Materials B.E. 2548, which was announced on 27 December 2005 and promulgated in the Royal Gazette, Page 14, Vol. 123, Special Chapter 11 Ngor, on 25 January 2006).

Office Waste

It refers to waste from MWA headquarters, branch offices, and four water-treatment plants. MWA manages its waste in line with government policies.

Sediments from Water Production Process Management

Wastewater from water-production process is largely water used to drain sediments and clean filter tanks. It therefore is sent through sediment-removal systems, using natural as well as machinery-enabled techniques, for treatment. After tests show sediments is free from contaminants that may significantly affect the environment, MWA has hired contractors to collect and dispose them. A key method for sediment disposal is to use such waste for filling land plots. MWA's management of sediments from water-production process complies fully with laws.

Volume of Sediments from Water Production

Water Treatment Plant	Disposed Sludge Volume			Dumpsites	Standard
	2018	2019	2020		
1. Bang Khen	47,280	50,083	62,026	Land-title deed no. 44655 in Nong Suea Sub-district, Pathum Thani province. Land owner Ms. Sonthaya Chaichana is the contractor for landfilling.	Passed
2. Sam Sen	5,648	4,909	3,154	Land-title deed No. 42562 in Samut Prakan's Phra Samut Chedi District	Passed
3. Thonburi	1,556	1,764	1,394	Land-title deed No. 22749 in Bangkok's Nong Khaem District. Land owner is Ms. Napas-sanan Sathavorn.	Passed
4. Mahasawat	16,597	17,913	18,452	Kept at plant	Passed

Office Waste Management

MWA has managed its office waste in line with government policies. There are four types of bins to separate waste - green for biodegradable waste; blue for general waste; yellow for recyclable waste, and red for hazardous waste - at its headquarters, branch offices, and four water-treatment plants. Moreover, MWA has educated its employees, workers, and cleaners about how to separate waste correctly.

The Bangkok Metropolitan Administration (BMA) collects waste that was separated at its origin once a week for its proper disposal. At MWA, waste is separated based on BMA's categorization criteria. Moreover, MWA has separated its discarded paper from other types of waste. The paper waste is stored at MWA's central warehouse before being sold.



Energy and Emissions

Regarding energy usage and air pollution, MWA mostly relies on electricity. In fiscal year 2020, MWA used a total of 438,935.67 MWh of electricity. Electricity consumption can be divided by water-production process, water-delivery process, and administrative/support units as follows:

To lay down guidelines for environmentally-friendly operations, the minimization of environmental impacts and causes of global warming based on ISO 14045, and Eco-Efficiency assessment, MWA has

set up the work panel on Eco-Efficiency. This panel is tasked with formulating guidelines, projects and activities to improve MWA's Eco-Efficiency in line with proper standard and also to increase the use of solar power, which is clean energy. The panel's works take into account the emissions of greenhouse gases and carbon compounds by procuring raw water, water-production, and water-distribution. At present, this work panel has been in the process of conducting its study.

Energy usage volume and the amount of carbon-dioxide emissions by MWA during fiscal years 2018 to 2020



Notes:

1. Electricity units between October 2019 and September 2020 from the SAP system, are already certified by the Office of the Auditor General of Thailand.
2. Emission Factor (0.5821) of the Thailand Greenhouse Gas Management Organization's (Public Organization) is used as reference.
3. Water-production and water-delivery system refers to raw-water system, water-production system, and water-delivery system.

Report on Fuel Usage by Category



Note: Fuel consumption by vehicles of MWA's units



Energy-efficiency Measures

Energy-efficiency Measures of Water Treatment Plants, Raw-water Pumping Stations and Water-delivery Pumping Stations

MWA has constantly monitored and analyzed electricity usage in its organization. As its water production volume has increased since fiscal year 2018, its electricity usage has also risen. Electricity, after all, is the key energy that drives water production and water transmission systems. From the process of raw-water pumping, to water production process, and to water transmission process, electricity has played a key role. MWA's electricity usage, therefore, fluctuates in line with water production, water pressure needed, water level of canals, and water level in filtered water tanks, etc. For energy conservation and energy efficiency, MWA has complied with the Energy Conservation Promotion Act B.E. 2535 (Revised Version). Its 4 water treatment plants, 10 water-delivery pumping stations, and 2 raw-water pumping stations, totaling 16 units altogether, have been controlled buildings. They are required to implement energy-efficiency measures prescribed each year by their units' energy-management panels. In 2020, the water production and water delivery units successfully reduced electricity usage by 1,831,871 kWh. The decrease was translated into the financial saving of about 6,406,296 baht.



Energy-Saving Measures of Water Treatment Plants, Raw-Water Pumping Stations, and Pumping Stations for Water Distribution in 2020

Unit	Measure	Results in 2020		
		(kWh/year)	Saving (baht)	
Raw-water Pumping Station	Sam Lae	Cleaning Air Conditioner	2,196	7,840
		Replacing mercury vapor lamps with LED lamps	128	453
	Bang Sue	Replacing 250W mercury-vapor lamps with 150W LED lamps	1,179	4,127
Water Treatment Plant	Bang Khen	Improving Motor Drive Pump No.8, 9 room at water-delivery pumping station 2	132,438	419,827
		Adjusting sluice gate	157,723	499,983
	Mahasawat	Measures to curb the process to wash filter ponds Phases 1 - 2	2,880	10,339
	Sam Sen	Changing water pumps and water-motor pumps used for wash water at Sam Sen Water Treatment Plant 1	11,362	39,311
		Changing water pumps used for sediment-containing water at Sam Sen	78,467	271,496
	Thonburi	Cost reduction for sedimentation process via sedimentation tank management	81,037	291,733
			Replacing 36W fluorescent lamps with 18W LED	183,852
		Two-way switch installations for energy saving	6,228	23,043
Water-delivery Pumping Stations	Bang Phli	Deploying the most energy-saving water pumps during off-peak period	33,872	120,923
	Lumpini	Energy-Efficient Lighting Systems at Stations	2,884	9,214
	Lat Krabang	Replacing high-pressure sodium lamps with LED streetlights	9,460	28,046
		Replacing high-pressure sodium lamps with LED spotlights	7,161	21,159
	Lat Phrao	Measures to determine cost efficiency of replacing Sherbius VSD with Variable Frequency Inverter	638,744	2,293,092
	Khlong Toei	Project to Save Energy by Alternating Air Conditioners	39,019	145,599
	Samrong	Replacing high-pressure sodium lamps with LED lamps	6,570	21,484
	Min Buri	Deploying 2 low-pressure water pumps in place of 1 high-pressure water pumps	48,000	168,956
	Tha Phra	Project to reduce ECC water-pump work hours by one hour on weekend (Sat/Sun)	20,800	74,464
	Ratburana	Alternating spotlights for filtered water tanks	18,688	65,698
Phetkasem	Using bypass for water pumps during some periods	349,183	1,227,640	
Total			1,831,871	6,406,296

Financial Information	Fiscal Year								
	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Assets (Million Baht)	56,774.2	60,634.4	63,268.1	66,751.2	68,254.4	72,214.9	75,108.5	79,365.8	81,337.9
Current Assets	5,018.3	7,772.5	9,816.0	13,564.0	14,873.5	17,343.6	21,561.4	20,751.8	13,653.8
Non-Current Assets	51,755.9	52,861.9	53,452.1	53,187.2	53,380.9	54,871.3	53,547.1	58,614.0	67,684.1
Total Liabilities (Million Baht)	11,146.8	12,703.2	11,920.4	12,051.6	12,435.9	15,405.8	14,599.2	15,742.2	15,055.4
Current Liabilities	4,537.0	6,340.9	5,401.4	4,853.6	4,932.4	4,678.4	4,453.4	4,059.6	3,105.6
Non-Current Liabilities	6,609.8	6,362.3	6,519.0	7,198.0	7,503.5	10,727.4	10,145.8	11,682.6	11,949.8
Equity (Million Baht)	45,627.4	47,931.2	51,347.7	54,699.6	55,818.5	56,809.1	60,509.3	63,623.6	66,282.5
Total Revenues (Million Baht)	17,830.4	19,114.7	19,492.2	19,917.2	20,074.2	19,193.2	19,203.0	20,051.4	18,045.0
Performance Results of Income	17,605.1	18,867.3	19,194.2	19,577.8	19,681.1	18,850.5	18,801.1	19,548.9	17,559.8
Revenue from Water Charges/Water Works Equipment Services	16,406.3	17,122.3	17,292.0	17,735.2	17,698.6	17,740.3	17,602.6	18,334.2	16,548.9
Revenue from New Water-meter Installations	370.6	424.6	455.0	410.1	391.6	406.6	396.7	385.9	247.9
Other Operating Revenue	828.2	1,320.4	1,447.2	1,432.5	1,590.9	703.6	801.8	828.8	763.0
Non-operating Revenue	225.3	247.4	298.0	339.4	393.1	342.7	401.9	502.5	485.2
Total Expenses (Million Baht)	12,038.7	11,869.9	12,615.4	12,767.2	12,904.5	11,624.8	11,683.8	13,047.6	12,422.0
Operating Expenses	12,084.9	12,326.0	12,646.7	12,749.1	12,831.2	11,701.4	11,676.6	13,012.8	12,390.6
Operating Expenses	7,259.4	7,832.2	7,907.8	7,983.4	7,945.7	7,305.8	7,142.7	8,173.6	7,536.1
Depreciation and Amortization	4,664.7	4,411.2	4,673.9	4,704.3	4,829.0	4,345.5	4,493.3	4,808.4	4,829.0
Interest Expenses and Loan Fees	160.8	82.6	65.0	61.4	56.5	50.1	40.6	30.8	25.5
Non-operating Expenses	(46.2)	(456.1)	(31.3)	18.1	73.3	(76.6)	7.2	34.8	31.4
Other Operating Expenses	2.0	28.8	5.3	2.5	2.6	10.9	26.0	36.7	33.6
(Gains) Losses on Foreign Exchange Rate	(48.2)	(484.9)	(36.6)	15.6	70.7	(87.5)	(18.8)	(1.9)	(2.2)
Net Profit (Million Baht)	5,791.7	7,244.8	6,876.8	7,150.0	7,169.7	7,568.4	7,519.2	7,003.8	5,623.0
Rate of Return on Assets (%)	10.11	11.95	10.87	10.71	10.50	10.48	10.01	8.82	6.91
Rate of Return on Equity (%)	12.89	15.11	13.39	13.07	12.84	13.32	12.43	11.01	8.48
Net Profit Margin (%)	32.48	38.40	35.83	36.52	36.43	40.15	39.99	35.83	32.02
Asset Management (Times)	0.31	0.31	0.30	0.29	0.29	0.26	0.25	0.25	0.22
Current Ratio (Times)	1.11	1.23	1.82	2.79	3.02	3.71	4.84	5.11	4.40
Debt to Total Asset Ratio (Times)	0.20	0.21	0.19	0.18	0.18	0.21	0.19	0.20	0.19
Debt Equity Ratio (Times)	0.24	0.27	0.23	0.22	0.22	0.27	0.24	0.25	0.23
Cost of Water Sold per Cubic Meter (Baht)	8.72	8.15	8.62	8.55	8.65	8.31	8.03	8.67	8.30
EBITDA	10,569.0	11,253.7	11,579.1	11,931.3	12,125.9	11,876.5	12,034.3	11,841.1	10,475.3



Operating Performance on MWA's Stakeholder Relationship and Engagement

General Infomation	Fiscal Year				
	2016	2017	2018	2019	2020
Total Water-Production Volume (Million Cubic Meters)	1,965.9	2,063.8	1,997.1	2,075.2	2,121.1
Bang Khen Water Treatment Plant	1,290.9	1,404.5	1,334.4	1,402.3	1,410.0
Sam Sen Water Treatment Plant	129.7	120.7	116.4	113.0	102.4
Thonburi Water Treatment Plant	30.9	40.5	37.4	41.1	36.4
Thonburi Water Treatment Plant	514.4	498.1	508.9	518.8	572.3
Total Water-Delivery Volume (Million Cubic Meters)	1,406.3	1,408.6	1,401.4	1,467.4	1,458.3
Households	653.8	656.8	651.5	675.7	694.3
Businesses, State Enterprises, State Agencies and Others	723.7	723.4	719.6	753.2	717.8
Public Water Sources and Others	28.8	28.4	30.3	38.5	46.2
Percentage of Water-Delivery Volume	71.53	68.25	70.17	70.71	68.75
Number of Water Users at the End of the Year	2,281,058	2,328,598	2,375,490	2,423,540	2,479,547
Households	1,835,430	1,878,888	1,921,897	1,957,391	2,010,824
Businesses, State Enterprises, State Agencies and Others	445,628	449,710	453,593	466,149	468,723
Domestic Consumption	2,244,815	2,292,106	2,338,779	2,386,832	2,443,405
Water Meter of ½" Size	1,394,915	1,421,764	1,459,347	1,510,537	1,571,405
Water meter of ¾" Size	783,235	802,913	811,431	807,907	803,240
Water Meter of 1" Size	66,665	67,429	68,001	68,388	68,760
Non-domestic consumption (Person)	36,243	36,492	36,711	36,708	36,142
Water Meter of 1 ½" Size	14,804	15,058	15,610	16,078	16,169
Water Meter of 2" Size	14,015	13,972	13,672	13,243	12,814
Water Meter over 2" Size	7,424	7,462	7,429	7,387	7,159
New Water Meter Installations (Person)	71,325	65,327	65,653	67,745	67,916
Average Water Usage Volume per Month (Cubic Meters)	50.88	49.85	48.55	49.58	47.98
Households	30.08	29.44	28.56	29.02	29.16
Businesses, State Enterprises, State Agencies and Others	135.57	134.54	132.56	136.14	127.67
Average Water Fee per Cubic Meter (Baht)	12.02	12.01	11.98	11.99	10.93
Households	10.03	10.03	9.99	10.00	8.96
Businesses, State Enterprises, State Agencies and Others	13.83	13.82	13.79	13.79	12.85
Total Number of Staff Members (Person)	5,386	5,403	5,365	5,378	5,384
Number of Employees at Yearend	4,326	4,385	4,310	4,303	4,339
Number of Workers	1,060	1,018	1,055	1,075	1,045
Ratio of Water Users per Staff Member (Person)	424	431	443	451	461
Population under Jurisdictions at Yearend	8,192,123	8,222,916	8,249,551	8,276,526	8,216,446
Number of Households under Jurisdictions at Yearend	4,099,437	4,210,444	4,323,941	4,436,973	4,534,086

Categorization of MWA Personnel Number of Staff by Sex Ratio

Line	Categories of Personnel															
	Levels 6 - 10 - Supervisory Positions				Levels 6 - 10 - Equivalent				Levels 1 - 5				Total			
	Male	Female	Total	Sex Ratio	Male	Female	Total	Sex Ratio	Male	Female	Total	Sex Ratio	Male	Female	Total	Sex Ratio
Governor	15	56	71	21:79	24	76	100	24:76	35	71	106	33:67	74	203	277	27:73
Administration	17	44	61	28:72	23	37	60	38:62	65	97	162	40:60	105	178	283	37:63
Finance	8	48	56	14:86	1	40	41	2:98	17	54	71	24:76	26	142	168	15:85
Engineering & Construction	93	27	120	78:22	22	20	42	52:48	133	70	203	66:34	248	117	365	68:32
Water Production & Transmission	123	37	160	77:23	84	23	107	79:21	513	93	606	85:15	720	153	873	82:18
Planning & Development	6	18	24	25:75	13	30	43	30:70	11	24	35	31:69	30	72	102	29:71
Information Technology	12	23	35	34:66	11	12	23	48:52	37	29	66	56:44	60	64	124	48:52
Eastern Services	92	114	206	45:55	17	36	53	32:68	594	344	938	63:37	703	494	1,197	59:41
Western Services	73	93	166	44:56	28	38	66	42:58	436	282	718	61:39	537	413	950	57:43
Total	439	460	899	49:51	223	312	535	42:58	1,841	1,064	2,905	63:37	2,503	1,836	4,339	58:42

Summary of Key Water-Production and Water-Delivery Operating Results	Fiscal Year			
	2017	2018	2019	2020
Water Quality				
Number of Specimens from Pipeline System	3,148	3,040	3,196	3,138
Escherichia Coli	undetected	3	1	2
Target	undetected			
Turbidity (NTU)	0.50	0.40	0.23	0.19
Target	no more than 0.50			
Acidity and Alkalinity (pH, Value/units)	7.24	7.21	7.19	7.37
Target	7.00 - 8.00			
Free Residual Chlorine (mg/L)	0.47	0.50	0.55	0.79
Target	at least 0.20			
Water Quality in Terms of Physical	100	100	100	99.97
Target	99.94	100	100	100
Water Quality in Terms of Chemical	99.87	100	99.81	98.82
Target	100	100	100	100
Water Quality in Terms of Bacterial	99.87	99.9	99.97	99.94
Target	99.74	99.87	100	100

Summary of Key Water-Production and Water-Delivery Operating Results	Fiscal Year			
	2017	2018	2019	2020
Operations				
Water Pressure (Meter)	10.028	8.814	8.470	6.876
Target	10.00	9.50	9.10	8.35
Number of Unplanned Downtime (Time)	30	30	28	28
Target	30	30	30	28

Customer Satisfaction about MWA's Service Quality

Service Description	Fiscal Year		
	2018	2019	2020
General Service	4.288	4.404	4.450
Branch Service	4.764	4.736	4.748
Drive-thru Payment	4.813	4.803	4.669
1125 Call Center	4.380	4.367	4.378
Pipe Replacement and Repairing	4.206	4.306	4.335
MWA Image	4.564	4.581	4.528
Service Points at Shopping Malls	-	4.772	4.752
Overall Satisfaction	4.524	4.559	4.571

Satisfaction about Product (Water) Quality

Service Description	Fiscal Year		
	2018	2019	2020
Quality (Water)	4.248	4.380	4.430
(Q1) No Abnormal Smell	4.328	4.426	4.469
(Q2) Water Clarity	4.381	4.421	4.477
(Q3) Proper Water Pressure	4.122	4.324	4.392
(Q4) Consistent Services	4.159	4.346	4.383

Electricity Usage Volume and Carbon Dioxide Emissions from Water Production/Delivery in Fiscal Year 2020

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	
System	Electricity Usage Volume (MWh)	35,954.79	35,031.91	35,480.10	35,606.72	33,601.48	37,136.21	40,625.87	41,231.90	38,226.67	34,948.41	35,085.32	437,591.03	
	CO ₂ Emission (tCO ₂)	20,929.28	20,392.08	20,652.97	20,726.67	19,559.42	21,616.99	23,648.32	24,001.09	22,251.74	20,343.47	20,423.17	254,721.74	
Raw Water System	Sam Lae	Electricity Usage Volume (MWh)	1,144.22	1,186.40	1,176.06	1,174.30	1,060.83	1,169.85	1,332.12	1,284.26	1,214.31	1,218.58	14,378.09	
		CO ₂ Emission (tCO ₂)	666.05	690.60	684.58	683.56	617.51	680.97	775.42	747.57	706.85	709.34	8,369.48	
	Bang Sue	Electricity Usage Volume (MWh)	686.35	686.36	599.36	379.33	353.30	444.32	483.36	515.01	602.41	691.87	703.72	6,832.74
		CO ₂ Emission (tCO ₂)	399.52	399.53	348.89	220.81	205.65	258.64	281.36	299.79	350.66	402.74	409.63	3,977.34
Bang Khen	Electricity Usage Volume (MWh)	18,013.45	17,376.44	17,467.27	17,642.68	16,696.81	18,476.73	20,925.63	20,474.98	18,960.75	17,427.98	17,342.92	218,331.05	
	CO ₂ Emission (tCO ₂)	10,485.63	10,114.82	10,167.70	10,269.80	9,719.21	10,755.31	12,180.81	11,918.48	11,037.05	10,144.83	10,095.31	127,090.51	
Water Production System	Maha-sawat	Electricity Usage Volume (MWh)	6,732.82	6,721.00	7,396.00	7,359.00	6,982.00	7,656.52	8,491.94	7,912.75	7,155.24	7,221.91	88,587.63	
		CO ₂ Emission (tCO ₂)	3,919.18	3,912.29	4,305.21	4,283.67	4,064.22	4,456.86	4,806.03	4,943.16	4,606.01	4,165.06	4,203.88	51,566.86
	Sam Sen	Electricity Usage Volume (MWh)	1,814.12	1,559.97	1,621.81	1,769.11	1,649.51	1,696.04	1,841.89	1,933.24	1,821.61	1,554.62	1,637.56	20,536.01
	CO ₂ Emission (tCO ₂)	1,056.00	908.06	944.06	1,029.80	960.18	987.26	1,072.17	1,125.34	1,060.36	904.95	953.22	11,954.01	
Thonburi	Electricity Usage Volume (MWh)	412.14	432.00	344.85	279.66	276.22	355.91	320.55	383.92	401.38	418.48	416.61	4,446.84	
	CO ₂ Emission (tCO ₂)	239.91	251.47	200.74	162.79	160.79	207.18	186.59	223.48	233.65	243.60	242.51	2,588.50	

Electricity Usage Volume and Carbon Dioxide Emissions from Water Production/Delivery in Fiscal Year 2020

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	
Samrong	Electricity Usage Volume (MWh)	946.00	970.00	891.00	903.00	888.00	1,002.00	914.02	1,025.22	984.59	932.00	931.00	11,249.84	
	CO ₂ Emission (tCO ₂)	550.67	564.64	518.65	525.64	516.90	583.26	532.05	596.78	573.13	542.52	541.94	6,548.53	
	Khlong Toei	Electricity Usage Volume (MWh)	350.16	350.12	433.17	434.16	413.18	427.11	397.22	473.13	385.38	373.12	444.13	4,965.05
	CO ₂ Emission (tCO ₂)	203.83	203.80	252.15	252.72	240.51	248.62	231.22	275.41	224.33	217.19	258.53	2,890.16	
Water Delivery System	Bang Phli	Electricity Usage Volume (MWh)	599.00	613.00	622.00	632.00	633.00	734.00	699.02	663.38	578.00	568.00	7,809.29	
		CO ₂ Emission (tCO ₂)	348.68	356.83	362.07	367.89	368.47	427.26	406.90	509.82	386.15	330.63	344.64	4,545.79
	Lat Krabang	Electricity Usage Volume (MWh)	642.01	561.00	572.00	585.00	570.00	515.00	516.01	560.19	501.77	448.09	465.21	6,409.45
	CO ₂ Emission (tCO ₂)	373.71	326.56	332.96	340.53	331.80	299.78	300.37	326.09	292.08	275.43	260.83	3,730.94	
Min Buri	Electricity Usage Volume (MWh)	724.00	687.00	678.00	698.00	609.15	759.00	696.02	726.82	564.12	495.00	486.00	7,660.22	
	CO ₂ Emission (tCO ₂)	421.44	399.90	394.66	406.31	354.58	441.81	405.15	423.08	328.38	288.14	282.90	4,459.01	

Electricity Usage Volume and Carbon Dioxide Emissions from Water Production/Delivery in Fiscal Year 2020

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	
Lumpini	Electricity Usage Volume (MWh)	735.32	709.32	648.33	580.32	586.31	644.31	553.36	642.43	690.21	560.33	555.35	564.46	7,470.04
	CO ₂ Emission (tCO ₂)	428.03	412.90	377.39	337.80	341.29	375.05	322.11	373.96	401.77	326.17	323.27	328.57	4,348.31
Lat Phrao	Electricity Usage Volume (MWh)	634.00	616.00	655.16	643.00	521.00	597.00	607.02	697.31	664.87	608.00	586.00	596.00	7,425.35
	CO ₂ Emission (tCO ₂)	369.05	358.57	381.37	374.29	303.27	347.51	353.34	405.90	387.02	353.92	341.11	346.93	4,322.30
Tha Phra	Electricity Usage Volume (MWh)	342.06	353.25	356.05	401.11	396.15	408.39	408.39	463.92	404.08	338.27	347.32	358.59	4,577.57
	CO ₂ Emission (tCO ₂)	199.11	205.63	207.25	233.49	230.60	237.72	237.72	270.05	235.22	196.91	202.18	208.74	2,664.61
Ratburana	Electricity Usage Volume (MWh)	1,081.08	1,105.00	1,069.02	1,099.03	1,093.00	1,262.01	1,700.11	1,400.53	1,290.14	1,153.01	1,218.11	1,194.03	14,665.06
	CO ₂ Emission (tCO ₂)	629.30	643.22	622.27	639.74	636.24	734.62	989.64	815.25	750.99	671.17	709.06	695.04	8,536.53
Phetkasem	Electricity Usage Volume (MWh)	1,098.05	1,105.06	950.04	1,027.04	873.04	988.02	1,039.11	1,235.32	1,094.96	975.01	960.03	901.13	12,246.80
	CO ₂ Emission (tCO ₂)	639.18	643.25	553.02	597.84	508.19	575.13	604.87	719.08	637.37	567.55	558.84	524.55	7,128.86

GRI Content Index (Core)

GRI Standard	Disclosure	Page and/or Website	SDGs	External Assurance	Comments/Omissions
GRI 102: General Disclosure 2016					
Organizational Profile					
102-1	Name of the organization	9			
102-2	Activities, brands, products, and services	9			
102-3	Location of headquarters	Back Cover			
102-4	Location of operations	10			
102-5	Ownership and legal form	9 - 10			
102-6	Markets served	21			
102-7	Scale of the organization	10 - 11, 21, 24			
102-8	Information on employees and other workers	24			
102-9	Supply chain	16			
102-10	Significant changes to the organization and its supply chain	No changes that may affect MWA's operations			
102-11	Precautionary Principle or approach	56 - 59			
102-12	External initiatives	27			
102-13	Membership of associations	83 - 85			
Strategy					
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102-15	Key impacts, risks, and opportunities	53 - 54			
Ethics and Integrity					
102-16	Values, principles, standards, and norms of behavior	3			
102-17	Mechanisms for advice and concerns about ethics	29, 57 - 59			
Governance					
102-18	Governance structure	25			
102-19	Delegating authority	25, 47			
102-20	Executive-level responsibility for economic, environmental, and social topics	47 - 51			
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GRI Standard	Disclosure	Page and/or Website	SDGs	External Assurance	Comments/Omissions
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102-29	Identifying and managing economic, environmental, and social impacts	42 - 45			
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102-31	Review of economic, environmental, and social topics	42 - 45			
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102-33	Communicating critical concerns	42			
102-34	Nature and total number of critical concerns				
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102-37	Stakeholders' involvement in remuneration	52			
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GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary	69		
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	103-3	Evaluation of the management approach	69		
GRI 201: Economic Performance 2016	201-1	Direct economic value generated and distributed (EVR)	131		
	201-2	Financial implications and other risks and opportunities due to climate change	69 - 70		
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	201-4	Financial assistance received from government	-		
Indirect Economic Impacts					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary	71		
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GRI 203: Indirect Economic Impacts 2016	203-1	Infrastructure investments and services supported	72 - 73		
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Procurement Practice					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary	17, 19		
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GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary	60		
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	103-2	The management approach and its components	126		
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	302-3	Energy intensity	-		
	302-4	Reduction of energy consumption	128 - 129		
	302-5	Reduction in energy requirements of products and services	-		
Water					
GRI 103: Management Approach 2016	303-1	Interactions with water as a shared resource	113		
	303-2	Management of water discharge-related impacts	123		
GRI 303: Water and Effluents 2018	303-3	Water withdrawal	113 - 116		
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	303-5	Water consumption	119		
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GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary	126		
	103-2	The management approach and its components	126		
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GRI 305: Emissions 2016	305-1	Direct (Scope 1) GHG emissions	-		
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	305-4	GHG emissions intensity	-		
	305-5	Reduction of GHG emissions	128 - 129		
	305-6	Emissions of ozone-depleting substances (ODS)	-		
	305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	-		

GRI Standard	Disclosure	Page and/or Website	SDGs	External Assurance	Comments/Omissions
Effluents and Waste					
GRI 103: Management Approach 2016	306-1	Waste generation and significant waste-related impacts	124 - 125		
	306-2	Management of significant waste-related impacts	124 - 125		
GRI 306: Waste 2020	306-3	Waste generated	124 - 125		
	306-4	Waste diverted from disposal			
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Employment					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary	105, 107, 110		
	103-2	The management approach and its components	105, 107, 110		
	103-3	Evaluation of the management approach	105, 107, 110		
GRI 401: Employment 2016	401-1	New employee hires and employee turnover	111		
	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	105 - 106		
	401-3	Parental leave	107		
Occupational Health and Safety					
GRI 103: Management Approach 2016	403-1	Occupational health and safety management system	86		
	403-2	Hazard identification, risk assessment, and incident investigation	87		
	403-3	Occupational health services	89 - 90		
	403-4	Worker participation, consultation, and communication on occupational health and safety	86 - 87		
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	403-6	Promotion of worker health	88, 90		
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	89		
GRI 403: Occupational Health and Safety 2018	403-8	Workers covered by an occupational health and safety management system	89		
	403-9	Work-related injuries	89		
	403-10	Work-related ill health	89		

LR Independent Assurance Statement

Relating to Metropolitan Waterworks Authority's Sustainability Report for the fiscal year 2020

This Assurance Statement has been prepared for Metropolitan Waterworks Authority in accordance with our contract but is intended for the readers of this Report.

Terms of engagement

Lloyd's Register Quality Assurance Limited (LR) was commissioned by Metropolitan Waterworks Authority (MWA) to provide independent assurance on its Sustainability Report 2020 ("the report") against the assurance criteria below to a limited level of assurance and materiality of the professional judgement of the verifier using LR's verification procedure. LR's verification procedure is based on current best practice, is in accordance with ISAE 3000 and uses the following principles of - inclusivity, materiality, responsiveness and reliability of performance data.

Our assurance engagement covered MWA's water supply operations and service activities in Bangkok, Nonthaburi, Samutprakan Provinces and specifically the following requirements:

- Confirming that the report is in accordance with GRI¹ standard, core option
- Evaluating the accuracy and reliability of data and information for only the selected indicators listed below:
 - Environmental: GRI 303-3 (version 2018) Water withdrawal, GRI 303-4 Water discharge.
 - Social: GRI 403-9 (version 2018) Work-related injuries, GRI 403-10 (version 2018) Work-related ill health, GRI 416-1 (version 2016) Assessment of safety and health impacts of product and service categories, GRI 416-2 (version 2016) Incidents of non-compliance concerning the health and safety impacts of product and service categories.

Our assurance engagement excluded the data and information of MWA's suppliers, contractors and any third-parties mentioned in the report.

LR's responsibility is only to MWA. LR disclaims any liability or responsibility to others as explained in the end footnote. MWA's responsibility is for collecting, aggregating, analysing and presenting all the data and information within the report and for maintaining effective internal controls over the systems from which the report is derived. Ultimately, the report has been approved by, and remains the responsibility of MWA.

LR's Opinion

Based on LR's approach nothing has come to our attention that would cause us to believe that MWA has not, in all material respects:

- Met the requirements above.
- Disclosed accurate and reliable performance data and information as no errors were detected.
- Covered all the issues that are important to the stakeholders and readers of this report.

The opinion expressed is formed on the basis of a limited level of assurance and at the materiality of the professional judgement of the verifier.

Note: The extent of evidence-gathering for a limited assurance engagement is less than for a reasonable assurance engagement. Limited assurance engagements focus on aggregated data rather than physically checking source data at sites. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

LR's approach

LR's assurance engagements are carried out in accordance with our verification procedure. The following tasks though were undertaken as part of the evidence gathering process for this assurance engagement:

- Assessing MWA's approach to stakeholder engagement to confirm that issues raised by stakeholders were captured correctly. We did this through reviewing documents and associated records.

¹ <https://www.globalreporting.org>

GRI Standard	Disclosure	Page and/or Website	SDGs	External Assurance	Comments/Omissions
Training and Education					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary	100		
	103-2	The management approach and its components	100		
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GRI 404: Training and Education 2016	404-1	Average hours of training per year per employee	101		
	404-2	Programs for upgrading employee skills and transition assistance programs	102 - 103		
	404-3	Percentage of employees receiving regular performance and career development reviews	104 - 105		
Local Communities					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary	94		
	103-2	The management approach and its components	94		
	103-3	Evaluation of the management approach	94		
GRI 413: Local Communities 2016	413-1	Operations with local community engagement, impact assessments, and development programs	94 - 99		
	413-2	Operations with significant actual and potential negative impacts on local communities	94 - 99		
Customer Health and Safety					
GRI 103: Management Approach 2016	103-1	Explanation of the material topic and its Boundary	75		
	103-2	The management approach and its components	75		
	103-3	Evaluation of the management approach	75		
GRI 416: Customer Health and Safety 2016	416-1	Assessment of the health and safety impacts of product and service categories	75 - 78		
	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	76 - 77		

- Reviewing MWA's process for identifying and determining material issues to confirm that the right issues were included in their report. We did this by benchmarking reports written by MWA and its peers to ensure that sector specific issues were included for comparability. We also tested the filters used in determining material issues to evaluate whether MWA makes informed business decisions that may create opportunities that contribute towards sustainable development.
- Auditing MWA's data management systems to confirm that there were no significant errors, omissions or mis-statements in the report. We did this by reviewing the effectiveness of data handling procedures, instructions and systems, including those for internal verification. We also spoke with those key people responsible for compiling the data and drafting the report from Head office and Samsen water treatment facility.

Observations

Further observations and findings, made during the assurance engagement, are:

- **Stakeholder inclusivity:** We are not aware of any key stakeholder groups that have been excluded from MWA's stakeholder engagement process.
- **Materiality:** We are not aware of any material issues concerning MWA's sustainability performance that have been excluded from the report. It should be noted that MWA has established extensive criteria for determining which issue is material and that these criteria are not biased to the company's management.
- **Responsiveness:** MWA has ensured good collaboration with stakeholders. They have also addressed, within the report, the expectations of all stakeholder groups.
- **Reliability:** Data management systems are considered to be well defined but MWA should develop further their approach to establish data collection and evaluation of OH&S statistic of contracted workers, and information on work-related ill health of their employee and contracted workers.

LR's standards, competence and independence

LR ensures the selection of appropriately qualified individuals based on their qualifications, training and experience. The outcome of all verification and certification assessments is then internally reviewed by senior management to ensure that the approach applied is rigorous and transparent.

The verification is the only work undertaken by LR for MWA and as such does not compromise our independence or impartiality.



Ms. Wiriya Rattanasuwan
LR Lead Verifier

Dated: 15th July 2021

On behalf of Lloyd's Register Quality Assurance Ltd.
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Survey on Satisfaction
towards MWA Sustainability
Report 2020

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