AUSSENWIRTSCHAFT AUSTRIA

AUSSEN WIRTSCHAFT BRANCHENREPORT MALAYSIA

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1. INTRODUCTION TO MALAYSIA: SOCIETY, ECONOMY, POLITICS

A federal constitutional monarchy, Malaysia consists of 13 states and 3 federal territories. Its landmass is separated into Peninsular (where the country's capitals Kuala Lumpur and Putrajaya can be found) and East Malaysia on Borneo by the South China Sea.

The population of Malaysia is estimated at 34.0 million in Q1 of 2024 (+2.3 % y-o-y growth), consisting of 30.6 million (90 %) Malaysian citizens and 3.4 million (10 %) non-citizens. This reflects a return to status quo from the Covid-era when restrictions in international travel led to a sharp decrease in non-citizens. The Malaysian population is made up of a wide variety of ethnic groups, with the majority (70.1 %) being Bumiputras ("Son of the Soil"). 22.6 % of the Malaysian population is under the age of 15 and 70 % are between the ages of 15 and 64, making the average population relatively young, though with 7.34 % of the population being over 65, Malaysia is already considered an aging society, further expected to reach "aged" status (over 14 %) in 2030. Due to the country's multicultural demographic, the majority of its residents grow up multilingual and speak at least two languages fluently. In large cities this generally includes English, which is the language of business throughout the country.

Malaysia ranked 55th out of 157 countries according to the World Bank's Human Capital Index. In order to realize the full potential of its population, it will greatly need to make further progress in education, health, and nutrition, as well as in the outcomes of social protection. Improving the quality of school education, rethinking nutritional interventions, and providing adequate social protection are therefore among the main priority areas.

Malaysia is one of the leading nations in the Southeast Asian economic area: the gross domestic product (GDP) per capita was USD 12,570 in 2023, almost triple from 2003, and is expected to continue its upward trajectory to reach USD 13,310 in 2024. Today Malaysia can be seen as a stable emerging country with a diversified economy. In addition to a traditionally strong agricultural sector, the production and service sectors also make a large contribution to the economy today. Meanwhile, the country has become a leading exporter of electrical appliances, electronic parts, and components.

According to the World Bank, Malaysia is one of the most investment-friendly economies in the world (ranking 12th for Ease of Doing Business in 2020). This has been a major contributor to job creation and income growth. After the global financial crisis in 2019, the Malaysian economy recorded average growth rates of around 6 %. However, this growth slowly flattened out over the years and was 4.4 % in 2019. According to Bank Negara (Malaysia's central bank), this was the lowest economic growth since the great financial crisis and was mainly due to lower production of palm oil, crude oil and natural gas, as well as a decline in exports amid the trade war between the US and China. Due to the unstable political situation and the effects of the Covid-19 virus, the economy shrunk by -5.5 % in 2020.

In 2021, Malaysia was under a state of emergency between January to August, and a resurgence in cases prompted the government to declare a nationwide lockdown on June 1st to curb the spread of the coronavirus. The tightening of containment measures pushed the country into recession for the first half of the year. However, due to the country's strong vaccination rollout as of July 2021, the year-end saw a modest recovery of +3.3 %, and strengthened further in 2022 with +8.7 %, moderating to +3.7 % in 2023. The nation's borders fully reopened on April 1 2022, allowing a fairly strong economic recovery, as the trade and tourism sectors are among the strongest contributors to GDP. The 2024 forecast by the World Bank (as of May 2024) is +4.4 %.

The current economic indicators per the Economist Intelligence Unit (EIU) forecasts (as of May 2024) are as follows:

Key Indicators	2023[a]	2024[b]	2025[b]	2026[b]	2027[b]	2028[b]
Real GDP growth (%)	3.7	4.4	4.5	4.6	4.6	4.8
Consumer price inflation (%)	2.5	2.5	2.5	2.3	2.2	2.1
Government balance (% of GDP)	-5.1[c]	-4.4	-4.1	-3.8	-3.6	-3.2
Current-account balance (% of GDP)	1.2[c]	1.9	2.3	2.9	3	2.8
Short-term interest rate (%)	3.6	3.5	3.3	3.2	3.3	3.3
Unemployment rate (%)	3.4	3.3	3.3	3.2	3.4	3.3
Exchange rate (USD:MYR)	4.56	4.71	4.51	4.3	4.17	4.11

[a] Actual [b] EIU forecasts [c] EIU estimates

A detailed statistical analysis can be found in the Country profile Malaysia.

In the medium term, it is expected that Malaysia will successfully transition from an "upper middle-income economy" to a "high income economy" between 2024-2026. According to the World Bank, Malaysia's economy will depend heavily on government measures to strengthen the private sector in the short term. Currently, the external environment makes export-oriented growth difficult, while local or investment-based expansion remains limited as the country recovers from the pandemic. Other factors impeding growth are higher-than-reported inflation rates, and a weak currency.

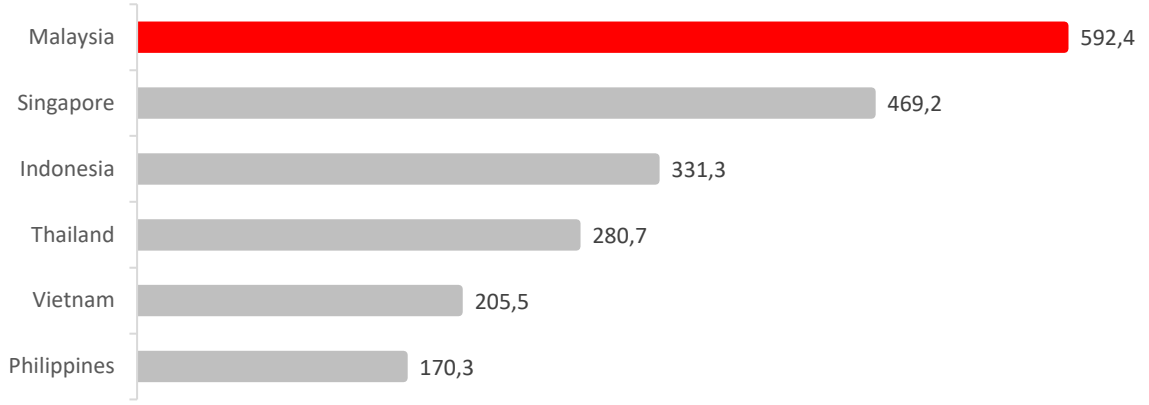
In the long run, economic growth will depend on increasing productivity levels. Although the productivity level in Malaysia has risen sharply over the past 25 years, it was still below that of several regional countries by comparison. Ongoing reform efforts are crucial.

At the political level, Malaysia is also far from stable. In 2018 the ruling coalition Barisan Nasional, which had been the dominant party, was defeated by the opposition for the first time since Malaysia's independence. This gave the country a strong, if temporary, upturn in sentiment. However, the resignation of the Prime Minister two years later, in February 2020, and that of his successor in August 2021, showed that the country still appears to be at a political impasse even after a change of government. The 15th General Election was held November 19th 2022. You can find more about the current political situation in our Economic report Malaysia, as well as our Malaysia country report.

2. STATUS QUO

MALAYSIA'S ECONOMIC RELATIONS WITH AUSTRIA

The importance of Malaysia for Austrian foreign trade is often underestimated and lesser known compared to other countries in the ASEAN community. In reality, however, the situation is very different, as the following graphic illustrates.



Foreign trade - Austria's exports in 2023 to the most important ASEAN countries in EUR million (source: Statistics Austria, 2024)

With EUR 402.7 million in Austrian exports in 2020, EUR 469.2 million in 2021, EUR 561.4 million in 2022, and 592.4 million in 2023 **Malaysia has ranked first among the ASEAN buyer countries for three consecutive years**. Singapore was in second place with EUR 496.2 million, followed by Thailand and Indonesia.

Exports to Malaysia have seen an especially strong growth in recent years (+23.4 % in 2020-2021, and +13 % in 2021-2022). This eased in the 2022-2023 term to +5.5 %, but the continued growth reaffirms Malaysia's position as the most important buyer of Austrian goods and services in the ASEAN region. While Singapore also enjoys a strong position, in terms of export volume relative to population size, it is important to note that some of the export goods reported for Singapore have their final destination in Malaysia. This positions Malaysia as the biggest and one of the most promising future markets for Austrian companies in the region.

Austria also imported some EUR 583.2 million worth of goods from Malaysia – a 8.9 % decline from 2022's EUR 640.1 million. The majority comes from HS code 85 (Electrical Machinery, Equipment and parts thereof) and 84 (Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof), for values of EUR 304.5 million and 93.1 million respectively.

Pertaining to water-related articles (pumps, turbines, valves, tanks, pipes), Austria exported a total of EUR 10 198 942 worth of merchandise to Malaysia and imported EUR 6 820 134. The exports from Austria are:

Code	Description	2022	2023
3917	Pipes Hoses Fittings of Plastics	€ 1 379 112	€ 605 314
7304	Pipes and Hollow Profiles seamless in Cast Iron	€ 262 505	€ 236 227
7306	Other Pipes Hollow Profiles ext. Diam. >406.4mm	€ 13 961	€ 86 376
7310	Containers with Capacity <300L	€ 0	€ 8 195
7411	Pipes of Copper	€ 9 123	€ 819
7412	Pipe Fittings of Copper	€ 207	€ 443
7608	Pipes of Aluminum	€ 23 061	€ 18 961
7609	Pipe Fittings of Aluminum	€ 147	€ 6 550
8410	Water Turbines and Wheels as well as Regulators	€ 512	€ 2 472
8413	Liquid Pumps Lifting Equipment for Liquids	€ 25 252	€ 1 121
8481	Fittings for Pipes Containers etc.	€ 1 130 776	€ 859 731

(source: Statistics Austria, 2024)

MALAYSIA'S WATER SUPPLY & WATER TREATMENT SITUATION

Due to rapid urbanisation and a high population growth, Malaysia is now facing issues arising from the impact of higher water demands (notably in the residential, industrial, and agricultural sectors), as well as climate change (e.g. heavier rains lead to increased flooding, which then affects water sanitation, or droughts causing water scarcity).

With the expansion of water infrastructure, access to clean water has improved greatly over the past decades, especially in rural areas, but wastewater treatment and quality of water for consumption still sees room for growth. Malaysia also encounters additional challenges when it comes to water loss/NRW and low water prices, both of which lead to wastage/overconsumption, exacerbating the problem of clean water supply. Furthermore, despite abundant water sources, many water facilities have a low reserve margin, and some states are water-stressed.

Malaysia's high rate of water loss is largely due to aging distribution mains or pipes, as well as cases of meter errors (either genuine or tampered) – this presents ample opportunities for Austrian companies who have solutions for parts related to the water distribution system such as pipes, valves, or tanks, both for industrial and agricultural use. Monitoring technology, especially with regards to water quality, which can also be applied for industrial use as well as potable water, would also be appreciated. With regards to sanitation, treatment and desalination solutions for wastewater will certainly find a niche in Malaysia.

VIEW OF THE FUTURE

The Malaysian government is aware of the shortcomings in its water industry and is taking measures to address the issues. There have been challenges in the implantation as the relevant ministries have in recent years undergone various restructuring activities – different sections of the former Ministry of Environment and Water as well as the former Ministry of Natural Resources, Environment and Climate Change have been redistributed to:

The Ministry of Energy Transition and Water Transformation (PETRA) which looks at flood mitigation, stormwater management, dams and other water structures, water supply infrastructure, and sewerage services, through its various departments (Department of Irrigation and Drainage (DID), Department of Water Supply (JBA), and Sewerage Services Department (JPP).

The Ministry of Natural Resources and Environmental Sustainability (NRES) encompasses the Department of Environment (DOE), which is responsible for Water and Marine Management, including development of water resources, water monitoring (river, marine, groundwater) and water quality/pollution management.

The 11th Malaysia Plan (2016-2020) & 12th Malaysia Plan (2021-2025)

In its five-year plans, the Malaysian government regularly sets the strategic goals and formulates fundamental commitments to the economic policy pursued.

Under the 11th Malaysia Plan (11MP), the government targeted to achieve National Key Performance Indicators (KPI) of 99 % for water supply coverage, 85 % connected sewerage services and 31 % reduction in non-revenue water by 2020. However, these targets were not fully realized by the end of the plan period. The national non-revenue water rate remained high at 37.2 % as of 2023, indicating ongoing challenges in water management. Despite this, efforts and resources have been extended into the 12th Malaysia Plan (12MP) to address these issues through comprehensive programmes and significant capital investment.

Further goals of the 11MP in the area of water management were:

- The reduction of water loss especially for non-revenue water (NRW), with the implementation of the National NRW Reduction programme
- Flood mitigation projects and coastal protection

The 12th Malaysia Plan continues the NRW Reduction programme with two approaches – the first approach targets states with an NRW rate of 40 % and above, where RM530.4 million is provided to acquire basic infrastructure to accurately measure NRW. Meanwhile Approach 2 allocates RM1.371 billion to help water operators to achieve their targets, with direct grants of 50-75 % of their annual expenditure on mitigation works.

The 12MP also focuses on the restructuring of the water sector to enable it to become a significant contributor to national growth and wealth creation. It outlines a 20-year agenda with the Water Sector Transformation 2040 (WST 2040), comprising four phases to set the strategic direction of positioning the water sector as a growth engine while ensuring water security:

- Phase 1 focuses on accelerating the adoption of integrated water resources management (IWRM);
- Phase 2 will focus on developing indigenous technology;
- Phase 3 will focus on achieving economies of scale; and
- Phase 4 will focus on Malaysia becoming the regional water industry hub.

Note: Phase 1 is the sole phase to be implemented under 12MP, with the remaining phases set to be carried out under future Malaysia Plans. A roadmap is also in the works to outline the relevant strategies, initiatives and programmes for each phase.

The Green Technology Master Plan (GTMP) 2017-2030

The master plan for green technology encompasses the six categories of:

- energy
- production
- transportation
- construction
- waste management
- water

and describes the strategic plans for developing green technologies to create a low-carbon and resource-efficient economy in Malaysia. With regards to the Water sector, the GTMP highlights the topics of

- Water harvesting;
- Water utilization efficiency and water savings;
- Wastewater treatment and recycling;
- Integrated planning and management to improve water conservation; and
- Institutional & regulatory support including development of a tariff setting mechanism.

More details of WST and GTMP can be found under the Legislations & Policy section of this report.

3. WATER

Malaysia is abundant in water resources, thanks to steady rainfall (annual average of over 2500 mm), as well as its geographical access to rivers and oceans (4675km of coastline). The national average demand for water is 237 litres per capita per day (LCD), which is far above the United Nations recommended usage of 165 LCD, and the estimated global average of 60 LCD.

Treated water consumption in Malaysia is constantly rising, with approximately 60 % of treated water consumed by domestic consumers. As of 2023, 97.1 % of the total population have access to water, with Kelantan, Sabah, and Sarawak still in need of improving their water supply infrastructure. However, sanitation services only cover 84.4 % of major cities. The Ministry of Energy Transition and Water Transformation (PETRA) aims to achieve 98 % coverage of clean water and sanitation in rural areas by the end of 2025.

Agriculture and Food is one of the largest users of water treatment facilities in Malaysia, followed by the Oil and Gas industry. Water is an essential parameter to Malaysia's agriculture sector, which contributed 6.6 % (RM118 billion) to the Gross Domestic Product (GDP) in 2022. This includes palm oil, rubber, livestock, forestry and logging, fishing and other agriculture activities. Water plays an important role in ensuring the agriculture sector is able to produce raw, semi-finished and finished goods for our consumption, as well as in food production.

Water also plays an important role in the economic sector of manufacturing and services, notably in industrial production. These business sectors are a driver of Malaysia's economy, contributing 82.6 % to the economy in 2022. As Malaysia has emerged as an Electronics and Latex hub, large scale use of high-grade treated water has flourished. Other key industries with high demand for treated water are textile, tannery, pharmaceuticals, and automobile assembly.

Water supply and sanitation in Malaysia is characterised by numerous achievements, notably universal access to water supply at affordable tariffs. The government has also shown a commitment to make the sector more efficient and to create a sustainable funding mechanism. Sector reforms enacted in 2006 also created a modern institutional structure for the water sector, including an autonomous regulatory agency, an asset management company and commercialised state water companies that have to reach certain key performance indicators that are monitored by the regulatory agency.

Nevertheless, there are still many planning failures and challenges that cause water pollution, loss of catchment areas as well as frequent water supply disruptions. Changes in land-use for the past few decades have also caused severe change in weather patterns that in turn affects reliability in raw water supply.

Recently, there have been several successful moves to restructure water services in various states, notably Selangor (2018), Pahang (2020), and Kedah (2021), which were also the three states with the highest loss in water operating revenue in 2018. In Selangor, the consolidation of water assets and operations under Air Selangor has significantly improved efficiency and service delivery . Pahang has progressed with key infrastructure projects such as the Pahang-Selangor Raw Water Transfer Tunnel, enhancing regional water security . Kedah successfully restructured its water services, resulting in a substantial debt write-off and investments in critical water treatment plant upgrades.

SECTOR REFORM

Since independence, water services were legally an exclusive responsibility of the 13 states of Malaysia, with no significant role for the federal government. However, as most states depend on fiscal transfers from the federal government, the federal government has always played a role in the water sector. Malaysia embarked on the privatisation of both water services and sanitation services during the 1990s, showing mixed results in both sub-sectors.

In 2003, due to high debt, poor efficiency and poor cost recovery, the federal government decided to embark on a sector reform to make the sector more efficient, create a sustainable funding mechanism, and improve customer service. This also strengthened the role of the federal government, and water services became a shared responsibility between the States and the Federal Government.

Two key laws that enshrined the reform were passed in 2006, after the failed attempts at privatisation: the Suruhanjaya Perkhidmatan Air Negara (SPAN) Act 2006 came into effect in February 2007, and the Water Services Industry Act 2006 (WSIA Act) in January 2008 (only applicable in peninsular Malaysia).

The National Water Services Commission/SPAN, the national regulatory agency for the sector, began its work in January 2008 when the new laws became effective. The Water Services Licensing Regulations also came into force in 2008.

The government then also declared that while existing concessionaires were allowed to operate until the end of their concessions, no more water services concessions would be awarded.

Service provision is clearly separated between water supply and sanitation. Since the 2006 reforms all water supply assets in peninsular Malaysia are owned by WAMCO/PAAB, a wholly owned company of the Minister of Finance Inc. and the holding company for the nation's water assets. They are then leased back to public operators (mostly State Water Companies) as well as private operators. All operators have to be licensed by the regulatory agency SPAN.

In the federal capital territory of Kuala Lumpur, the administrative city Putrajaya, and the state of Selangor, initial long-term contracts and concessions awarded to private stakeholders were eventually bought back at the end of the term by the State. Services and operations were consolidated in Sept 2019 and are now provided by the state company Air Selangor to treat and distribute most of Selangor's water, while assets are owned by PAAB.

In Sabah, the state government is pushing for a water commission to boost the state's efficiency and reduce bureaucracy in dealing with long-standing water issues in Sabah, similar to SPAN.

The Utilities Ministry of Sarawak is planning to establish an integrated management office (IMO) to streamline and enhance water supply. This will involve a consolidation of the 3 main operators into a single entity under the ministry.

SANITATION

Sanitation (sewerage and wastewater treatment) is organised differently. The largest wastewater operator is Indah Water Konsortium Malaysia (IWK), which is Malaysia's national sewerage company and handles sewerage and wastewater treatment all over peninsular Malaysia. IWK is owned by the government, via the Ministry of Finance Incorporated, which took over the entire equity of in 2000.

The company has since 1994 been awarded the concession for nationwide sewerage services, prior to which, was under the responsibility of local authorities. Since then, Indah Water has progressively taken over the sewerage services from local authorities in all areas except Sabah and Sarawak, with Kelantan being taken over in 2020, and Johor Bahru in 2021.

As the national operator of sewer services for Malaysia, IWK currently uses the purified water from their water reclamation treatment plant to clean its filters. However, the volume of water treated by IWK and national non-domestic water usage is similar so IWK would like to fill this gap. IWK also produces 120,000 tonnes of sludge annually, the bulk being sent to landfills.

Under the Green Technology Master Plan, this will be used as agents for farming, soil reconstructions and other industrial processes. As this sludge is rich in bio contents and can be a good form of fertiliser, some local authorities are interested in using it as soil conditioners. One example is a 2007 project with Rubber Research Institute of Malaysia for the use of biosolids as fertiliser for rubber trees. Other collaborations

include transformation into bio-pallens pellets (with Universiti Putra Malaysia) or forestry application (Forest Research Institute of Malaysia), as Malaysian standards prohibit the application of sewage water directly onto food crops.

The 'Black Soldier Fly Larvae' project involves sludge being fed to a special larvae, which converts the sludge into protein. The larvae are then used as animal feed, which will be a major revenue earner.

Finally, biogas from some plants is used to generate electricity and reduce operational costs. Currently there are six plants with facilities to reuse methane, with the potential of generating up to 10,000m3 per day and produce 20MWh per day. This has allowed IWK to reduce electricity consumption by about 20 % at these plants, saving an estimate RM2 million a year.

With regards to the states in Borneo, Sarawak has its own Sewerage Services Department which is responsible for the planning and establishment of public sewerage systems, as well as issuing guidelines and regulating the process for sewage treatment and disposal. There are several Centralised Sewerage System Packages that have been approved, for example Kuching (Phase 2) and Miri, which both began construction in 2017, and are valued at RM 750 million and RM 428 million respectively.

Sabah's sewerage system was handled by its Works Ministry until 2020, when it began establishing its Sewerage Services Department. In 2022 it began building the Sandakan STP and sewerage pipeline construction project, which is expected to be completed in 2025.

In 2022, the tariff for connected sewerage services and emptying of septic tanks for the domestic category underwent streamlining across peninsular Malaysia and Labuan, with an adjustment to better reflect the actual costs of the services. Most of these were effective from 1st January 2024, and the price will further increase as of 2026, however even with these adjustments the fees are still below actual cost. Details can be found at https://www.span.gov.my/document/upload/3s5hKOnlC96LQKU5vBhh4nbLhGF3A5w0.pdf. Meanwhile, in Sabah and Sarawak, there are currently no sewerage fees. Though it has been suggested in order to maintain the sustainability of the services, there has also been significant pushback which has delayed any sort of implementation.

DESALINATION

Due to Malaysia's ample groundwater and rainwater resources, desalination has historically been underutilized. However, recent developments indicate an increasing interest in this technology. The first seawater desalination plant in Malaysia began operations in 2018. Since then, there have been several notable projects aimed at addressing future water needs and ensuring water security.

However, the increasing water stress in several states has led the government to explore new methods and plans to mitigate water risks, of which desalination has strong potential, thanks to the 4675km of coastline that provides ample supply of sea water. One of the ideal options in managing clean water is through the seawater desalination process, and membrane technology that involves reverse osmosis has been recognized as one of the sustainable aspects in the desalination industry.

Penang

Penang is a notable example of the states investing in this technology. Among the projects proposed in their "Penang Water Supply Initiatives 2050" (PWSI 2050) study is the Penang Desalination Water Supply Scheme (PDWSS), which has the potential to yield 250 MLD. The plan is to construct a desalination facility in the southern area of the island to cater to Balik Pulau area and the upcoming three islands under the Penang South Reclamation project (due 2030). Phase 1 of PDWSS is scheduled for commissioning in December 2024, with subsequent phases possibly implemented until 2050.

Since Penang is surrounded by sea, it has theoretically unlimited access to usable sea water for desalination. As such, Penang is looking to pursue large-scale desalination projects to better insulate the state from long-term raw water risks: in January 2024 one politician mooted the investment into a desalination plant to safeguard their water sovereignty.

Kelantan
The first establishment of a seawater desalination plant in Malaysia was in Bachok, Kelantan, which began operations in April 2018. It is a Seawater Reverse Osmosis (SWRO) plant with a production capacity of 500,000 L/day, supplying freshwater to about 3300 residents. Although considered a small-scale plant, it has been helpful in solving the 45-year-long water crisis in the area, and also stimulated economic growth and improved health and quality of life of the local community. The sustainable water supply from the plant also proved to be a catalyst for the development of the surrounding area.

The construction of the plant and raw water intake system were implemented by the Center for Development and Property, Universiti Malaysia Terengganu and the installation of the water treatment system was conducted by AMTEC, Universiti Teknologi Malaysia. Discussions were also conducted with Air Kelantan Sdn. Bhd, Bachok and few local authorities. In general, local authorities are very supportive of the installation of desalination plants to supply clean and safe water to residents.

Sarawak
Sarawak also has a great potential in using desalinated water as alternative source of water supply for future, especially in coastal area. Initially announced as early as 2013, eight water treatment plants were constructed under the Saltwater Desalination Program of the controversial 1Malaysia Development Berhad (1MDB) Foundation to provide desalination treatment in rural areas. However, by 2018, there were extensive repair works required for all eight plants which had malfunctioned. RM5 million was allocated the same year for the repairs, implemented by Sarawak Rural Water Supply Department (JBALB), to address acute water shortage in the coastal villages.

In 2019, Universiti Malaysia Sarawak (Unimas) signed a Memorandum of Understanding with Senari Synergy Sdn Bhd to resolve inconsistent water supply issues in rural areas of Sarawak. The cooperation entails the development of a standalone system that will help complement the existing Sarawak State Water Grid.

Unimas has over the years undertaken research in water desalination and has provided standalone water supply to several remote areas and now aspires to upgrade rural water supply through its continuous research and innovation in the area of nanotechnology. Meanwhile, Senari Synergy has the necessary technical expertise and relevant project management skills.

Sabah
A hybrid power and seawater desalination system was successfully completed in 2021 in Sebangkat island and is seen as a replicable model for other similar communities living on islands of rural areas, as it is not dependent on grid energy resources and can also serve as an alternative source of raw water to address long-term clean water supply concerns.

Melaka
A seawater reverse osmosis desalination project was implemented by AIRB for Air Melaka, to supply treated water from the mainland to Pulau Besar island via submarine pipe. The plant has a treated water capacity of up to 25m3/hour or 500m3/day and has been in operation since 2020.

Other
The Malaysian power corporation Malakoff, a subsidiary of the MMC Group, also does business in desalination but not in Malaysia. On the international front, as an independent water and power producer, they own a net capacity of approximately 588 MW of power production and 472,975 m³/day of water desalination, with 4 plants in the Middle East: Shuaibah Phase III IWPP, and the Shuaibah Phase III Expansion IWP, both in Saudi Arabia, Al Hidd IWPP in Bahrain, and Al Ghubrah IWP in Oman.

Malaysian conglomerate YTL owns a 100 % interest in YTL PowerSeraya Pte Ltd, the second largest power generation company in Singapore in terms of installed capacity, which also constructed the first 16" SWRO Membrane Desalination Plant in Singapore.

INDUSTRIAL WATER

According to the Compendium of Environment Statistics, Malaysia 2022, water consumption for the domestic/household category accounted for 60.5 % of national use, compared to 39.5 % for industrial. However, its annual growth rate was relatively modest (2.7 %) whereas industrial water use shows a strong growth of 5.3 %.

In recent years, Malaysia has emerged as a hub for Electronics (production of semi-conductors, ICs, passive components, printed circuit boards, metal stamped parts and precision plastic parts, transistors, valves, electrical apparatus, telecommunications equipment and parts) and Latex (medical gloves, catheters, condoms). These industries require high use of water, alongside other key industries such as textiles, tanneries, pharmaceuticals, and automobile.

Production facilities for these items are chiefly located in the states of Johor, Kedah, Perak, Penang, and Selangor, which has increased their demand for water use. Three states recording the highest water consumption are Selangor (30.1 %) followed by Johor (12.4 %) and Perak (8.3 %).

Treated sewage wastewater is now being supplied to industries; instead of discharging it into rivers, Indah Water Konsortium (IWK) is looking for practical applications of the three by-products from sewage, which are bioeffluent (wastewater), biosolid (sludge) and biogas.

Currently, IWK's tasks are to collect the sewage, treat it to meet Environment Department (DOE) standards and return it to the environment. However, in the interest of promoting a circular economy, as the three by-products are valuable resources that could be reused, IWK is adopting a waste-to-wealth approach by selling these by-products.

With the proper infrastructure, IWK believes it could potentially meet 15 % of non-domestic demand, which is about 670MLD of water. Supplying for non-human consumption purposes like industries is a practical approach, as in some areas, industry uses up to 40 % of the water supply. If this can be replaced by treated wastewater, there will be more water for other sectors like residential and offices. The challenge is meeting demand and logistical support; as some users need different grades of water, which require further filtration. Logistically, water supply method is also an issue. While IWK has listed 10 STPs that can be utilised to meet industry's demand, some STPs are located far from industrial areas which makes transportation a challenge. The typical method of sending water by lorry is neither cost-effective nor environmentally friendly.

The best method of supplying water is via underground pipeline, however in areas of more rural concentration, this is not practical. Laying pipelines in mature township such as near Pantai 2 Regional STP – the biggest sewage treatment plant in Asia Pacific treating 250MLD, is also challenging as there are no factories nearby which need the water supply, and construction of new pipelines would cause traffic obstructions and disturbances to the surrounding area. This means that only 1 % of the treated wastewater is reused within the complex, for purposes such as cleaning and flushing toilets.

A joint venture in 2021 between IWK and Air Selangor will supply the treated water for non-potable use, via a special purpose vehicle company, Central Water Reclamation Sdn Bhd. IWK has also started discussions with Syarikat Air Melaka Bhd and other water operators in other states.

Terasek E Hydra Sdn Bhd, a water reclamation company, built the first plant attached to an STP. Located in Setia Alam, it began operations in 2019 and is fitted with ultrafiltration and reverse-osmosis systems to purify the water to meet industry demand. They distribute 5MLD (70 % of their 8MLD intake) of treated wastewater to industries nearby via underground pipelines for landscaping, cleaning, and construction purposes.

In response to demand from the surrounding industrial area, Terasek E Hydra plans to expand the plant to increase capacity. With the main pipeline successfully built, it will be easier to connect the pipes to future factories. They also have plans to build similar plants in the state of Penang.

4. CHALLENGES

Within Southeast Asia, Malaysia has one of the most developed and best organized water infrastructures, with one of the highest rates of access to clean water and sanitation. However, there are still major challenges in the Malaysian water industry, notably with regards to water supply and resource management, water loss, and aging infrastructure.

WATER SECTOR STRUCTURE & MANAGEMENT

Water and Sewerage Services have the lowest revenues amongst major utilities in Malaysia. Water sector revenue is only 12 % of the Electricity sector or Telecommunications sector, while Sewerage sector is less than 2 %. Water tariffs in Malaysia, already one of the lowest in Asia, have been experiencing slow growth over the past 30 years and this has obviously impacted the ability of water operators to sustainably manage their operations and services to maintain access to clean water.

However, water restructuring faces many obstructions:

- Tariff Setting: The water industry has been calling for better water pricing and the relevant tariff mechanism. In March 2021, the then-KASA Minister mentioned that a new proposal of the Water Tariff Setting Mechanism (TSM) has been drafted to set new water tariffs, and this was finally implemented as of February 2024, with an average hike of RM 22 sen per cubic meter. (New tariffs by state can be found here: Water Tariffs 2024.) However, this is still insufficient to adequately cover the actual costs of water supply services.
- Politics: Until the TSM, tariffs for some states were based on political considerations, while growing disparity of tariffs between states that have adopted asset-light structure and those not migrated created problems for water industry restructuring because of socio-political issues. For example, Pahang, Perlis, and Kedah tariffs were much lower than Johor or Melaka (though the TSM adjustments have moderated the discrepancies), and Kedah has been on a 'water war' with Penang over its water catchment areas in the Ulu Muda forest.
- Management: Until recently, there was no single agency in the country responsible for the management of water – even now, while most of Peninsular Malaysia is consolidated under IWK and SPAN, Penang, Sabah, and Sarawak have their own agencies. There is also insufficient coordination of agency activities at the state and federal levels, ineffective regulatory structures, and poor enforcement. The government has also highlighted ineffective implementation of policies, and lack of consideration of water in development planning, which would prolong the problems of financial sustainability in the water supply and sewerage services.

WATER SUPPLY & SCARCITY

Malaysia, like many other countries in the region, has seen strong effects of climate change on raw water supply:

- Some dams lost their yield as lands for catchment have been used for crops/plantation. In March 2024, seven dams hit warning levels, indicating reserve levels below 60 %, and in April, five of them further descended to "critical" or "danger" status: Air Itam Dam in Penang (35 %), Sembrong Barat Dam in Johor (31.65 %), while Padang Saga Dam, Muda Dam, and Malut Dam in Kedah had readings of 39.3 %, 35.6 % and 29.5 % respectively.
- Increasing incidents of raw water contamination especially during dry seasons.
- Lack of viable alternative sources as there are also concerns the on sustainability of the current solutions, Off River Storage and Coastal Reservoirs.
- Overreliance on one single river as the main source (e.g. Sungai Selangor, Sungai Muda, or Sungai Johor). For example, 80 % of Penang's water supply (approx. 100 MLD) is from Sungai Muda, and they would not be able to sustain their increasing demand.
- Some states (e.g. Melaka, Perlis, and Penang) are extremely water stressed.

Due to underinvestment and aforementioned low water tariffs, many states are unable to meet payment obligations to maintain a healthy reserve margin. This means a low reserve margin for major water facilities services such as water treatment, raw water intake, distribution storage, pumping capacities, etc. which lead to issues such as:

- Water operators face difficulties in service restoration whenever there is scheduled or unscheduled shutdowns, and consumers suffer as operators can take many days to normalize service.
- Data from Environment and Water Ministry (KASA) showed that as of 2020, the national average margin was 11.5 %; In 2022, a margin of 12.02 % was recorded, which is still below the SPAN recommendation of 15 %. Five states even recorded treated water reserve margins below 10 %: Perlis (8.3 %), Sabah (7.3 %), Melaka (4.7 %), Kedah (0 %) and Kelantan (0 %).

The ongoing growth in Malaysia's population and degree of urbanization poses major challenges to urban planning, as wastewater management and adequate sewage systems have not evolved at the same rate. Overconsumption and increased demand have further exacerbated the problem, as the country's low tariffs have resulted in the excessive usage of water, with average residential use at 237 litres per person per day (vs the WHO target of 160 litres/person/day) and despite their water-stressed status, Penangites are the highest consumers of water at 303 litres per capita/day, largely due to their particularly low tariffs (prior to the TSM adjustment).

WATER LOSS

Malaysia has a significant water loss problem, which has put a strain on WTPs that are already producing water at maximum capacities, and in turn affects water supply to consumers. The two main water losses stem from:

a) High non-revenue water (NRW), or treated water "lost" enroute to users:

- As of 2023, the national NRW is approximately 37.2 %, slightly higher than the 36.9 % reported in 2020, despite of past efforts from the government to reduce the national NRW to 25 % by 2020. The states with the highest NRW are Kedah, Kelantan, Pahang, and Sabah, all having over 40 %, with Kedah going as high as 57 % in 2023.
- The main causes of NRW are due to leaks, which largely stems from aging distribution mains or pipes, contributing over 70 % of losses. Asbestos cement (AC) pipes still in use in Malaysia makes up 27.1 % of the total distribution pipelines, which is some 41,560 km, however extensive replacements of pipes and associated equipment such as valves and pressure regulating valves are costly.

b) Commercial losses (apparent losses) that include water theft, meter errors, or billing anomalies:

- Water theft, also known as unauthorised consumption, is from an illegal connection made to siphon water without payment to the water provider, and mostly happens in remote locations using underground connections. Nevertheless guilty premises have included construction sites, industrial plants, and farms. SPAN in 2023 proposed an increase to the penalties for guilty parties, but the amendment has yet to be made.
- Faulty meters – meters that are either out of order, or sabotaged to give an inaccurate or reduced reading – constitute a large portion of commercial losses.
- Billing anomalies typically refers to unbilled/unmetered legitimate consumption, such as water usage for firefighting, street cleaning, or flushing of mains and sewers.

INFRASTRUCTURE & WATER QUALITY

Water quality in Malaysia is strongly correlated to its water infrastructure. Unfortunately, much of the infrastructure and pipes are old and are prone to damages, which lead to problems such as frequent pipe bursts, discolouration of treated water, high turbidity (especially in Kelantan), water pressure problems (common in Kedah), or even water disruptions due to delays in replacement of aging infrastructure. It was also noted that 16 out of 55 existing dams are over 50 years old, therefore assessments of their design and safety would be required.

Addressing these issues requires significant investment, such as the construction of new water treatment plants, upgrading of existing water infrastructures or replacement of equipment. However, water operators note their lack of funds to modernize asset management and replacement (pipes, valves, leak detectors), acquire online quality analysers, etc. The new TSM is intended to generate more revenue for the operators to address these issues and adopt the suitable solutions.

Industrial and agriculture water use also contribute significant challenges to water quality, due to high water demand, combined with aging or poor maintenance of infrastructure and release of effluents and other pollutants into rivers or other water sources. A lack of sufficiently deterring regulations and insufficient enforcement further worsens the situation.

While most of Malaysia's water supply pollution stems from industry and agriculture, there are also elements of public interference, as many rivers and storm drains are clogged with rubbish, then leading to insufficient drainage and increasing flood activity.

As flooding unfortunately remains a regular occurrence in the country, and has worsened with climate change, the government has highlighted the need for water-related disaster risk management. Their financial losses from disasters are also significant, with costs ranging from several hundred millions to billions of Ringgit per major flood event. Experts have attributed the blame to an inefficient and outdated flood mitigation system coupled with unchecked development and poor drainage: despite sufficient alert from the Meteorological Department, the lack of proper flood control infrastructure prevented actionable measures to reduce the impact.

Malaysia's constant development also contributes to this problem, as most mitigation projects calculated worst-case scenarios based on existing development – when there is a change in land use, the projected calculations are no longer adequate. Overdevelopment in forested areas also reduce natural buffer zones and lead to hydraulic jumps. Other areas of concern include critical infrastructure at the major ports (Port Klang, Penang Port, Kuantan Port) which would impact trade and economic activities.

Some current urban flood management strategies in Malaysia have shown some effectiveness, notably initiatives like the National Disaster Management Agency (NADMA) and the Stormwater Management and Road Tunnel (SMART) in Kuala Lumpur. However, challenges persist, and the government is looking at other solutions such as enhanced drainage systems, early warning systems, and the integration of natural-based approaches at river basin level and protection or reforestation of mangrove areas.

5. MARKET ENTRY

ACTORS & INSTITUTIONS

The main players in the water sector are the federal government (Department of Environment (DOE), Department of Irrigation and Drainage (DID), Department of Water Supply (JBA), Sewerage Services Department (JPP)), state governments (below), and the national water operator Indah Water Konsortium (IWK).

Johor: All water matters fall under the Johor State Government.
Kedah: Syarikat Air Darul Aman (SADA) and Lembaga Sumber Air Negeri Kedah (LSANK)
Kelantan: Air Kelantan (AKSB)
Melaka: Syarikat Air Melaka (SAMB) and Melaka Water Regulatory Center
Negeri Sembilan: Syarikat Air Negeri Sembilan (SAINS Water)
Pahang: Pahang Water Management Berhad/Pengurusan Air Pahang Berhad (PAIP)
Penang: Penang Water Supply Corporation/Perbadanan Bekalan Air Pulau Pinang (PBAPP)
Perak: Lembaga Air Perak and Perak State Department of Irrigation and Drainage
Perlis: Syarikat Air Perlis
Sabah: Sabah Water Department (JANS)
Sarawak: Ministry of Utilities and Sarawak Rural Water Supply Department (JBALB).
There are also city water agencies, e.g. Kuching Water Board and Sibu Water Board.
Selangor (and Federal Territory Kuala Lumpur): Air Selangor
Terengganu: Syarikat Air Terengganu

Indah Water Konsortium: IWK operates and maintains about 7,000 sewage treatment plants (STP) nationwide, across 19,134km network of pipelines, treating 5,600MLD (million litres per day) of water. About 200 plants are added to their assets annually. Their service covers most of Malaysia, excluding Kelantan, Sabah, Sarawak and certain parts of Johor. According to IWK, Malaysia has 18,375MLD of raw water resources, with national water consumption at 10,786MLD, of which 4,332MLD is used for non-domestic purposes.

Regulatory matters are handled by the National Water Services Commision/Suruhanjaya Perkhidmatan Air Negara (SPAN), and water management is under Water Asset Management Company/Pengurusan Aset Air Berhad (PAAB).

Within the federal government, there are several ministries and departments are responsible for different areas and aspects of water management:

The Department of Environment (DOE), under the Ministry of Natural Resources and Environmental Sustainability (NRES) administers, coordinates and implement programs in the Water and Marine Division to meet the requirements of the Environmental Quality Act 1974, as well as International Agreements/ Treaties/ Conventions related to water and marine management.

Meanwhile, the newly-minted Ministry of Energy and Water Transformation (PETRA) now encompasses the Department of Irrigation and Drainage (DID), Department of Water Supply (JBA), and Sewerage Services Department (JPP). The ministry is responsible for overall policy planning and is poised to establish a framework for the transformation of the water services sector. The PETRA Water Transformation plan aims to restructure, strengthen, and rationalise the considerably fragmented nature of the water industry and will entail guidance on the economics, management, and governance of water. Measures considered are the adoption of digitalisation and AI to enhance sustainability, improve operational efficiency, and enhance revenue management.

LEGISLATIONS & POLICIES

The main legislations which provide the legal framework for the water sector are:

- Waters Act 1920 [Act 418]
- Drainage Works Act 1954 [Act 354]
- Water Supply (Federal Territory of Kuala Lumpur) Act 1998 [Act 581]
- Water Services Industry Act 2006 [Act 655]
- National Water Resources Policy

Until the PETRA Water Transformation Plan is announced, the key policy governing the Water sector is the Green Technology Master Plan (GTMP) and the Water Sector Transformation 2040 (WST 2040) agenda.

Green Technology Master Plan (GTMP) 2017-2030

The master plan for green technology is intended to set out the country's advancement in green technologies and lays the foundation for cultivating mindsets and behavioural changes to instil a greener lifestyle amongst the community. The GTMP also plays an integral part in supporting the Transformasi Nasional 2050 (TN50) plan, an initiative that aims to put Malaysia in the top tier of countries in the world for economic development, citizen well-being, and innovation by 2050.

The GTMP outlines the targets of respective key focus areas of green technology applications and aims to provide a clearer picture on the Government's commitment to creating a conducive ecosystem for green technology development, shifting from technology adoption to technology production. The document also details within the key focus areas the achievements, targets, and existing initiatives which the Government and/or private sector are undertaking, or will commit to.

The six key sectors are Energy, Manufacturing, Transportation, Building, Waste, and Water, and the goals established in each sector will be progressively fine-tuned in each 5-year National Development Plan. Each sector has its own unique challenges but there are also common cross-cutting challenges from which strategic areas of intervention have been identified.

With regards to the Water sector, the document highlights the importance of water management, which is crucial for sustaining long-term economic growth and addressing water-related issues exacerbated by climate change. A summary of the key points describing the embedding of green technology in the Water sector is as follows:

- Water harvesting
  - Promotion of Rainwater Harvesting Systems (RHS) to address water scarcity;
  - Development of comprehensive technical guidelines for RHS, including design, materials, pumps, filtration systems, storage systems, tank sizing, maintenance scheduling, and water quality; and
  - Collaboration with stakeholders, including the government, private sector, public, and NGOs to enforce related laws and facilitate knowledge transfer of RHS technologies from foreign partners (e.g. Germany and Australia).

- Water utilization
  - Introduction of Water Efficient Products Labelling Scheme (WEPLS) to raise consumer awareness and promote the use of water-efficient products, mandatory by 2019;
  - Strategic plan to enhance the effectiveness of WEPLS, targeting suppliers and consumers; and
  - Matching water demand and supply at an effective water tariff rate, to encourage water savings.

- Wastewater treatment
  - Recycling treated effluent and sludge to reduce pressure on potable water supply and promote sustainability. Sludge to be recycled as biosolids for fertiliser, energy production, and raw materials for other green technology products;
  - Targets include recycling one-third of treated effluent and 100 % sludge by 2030, reducing Non-Revenue Water (NRW) to 25 % by 2025 and 15 % by 2030.

- Integrated Urban Water Cycle Management (IUWCM)
  - Focus on integrated planning and management of urban water cycles to improve water conservation and efficient use of water;
  - Mapping of water demand and supply to identify cost-effective alternative water resources;
  - Collaboration among government entities to explore water harvesting and storage technologies, particularly in water-stressed states; and
  - Implementation of IUWCM to achieve 40 % independence from existing treated water supply in KL.

- Institutional & regulatory support
  - Strengthening the institutional framework via policy development, including the National NRW Reduction Program and the Water Demand Management Master Plan;
  - Enhancing stakeholder engagement to address state-specific concerns and design strategies for monitoring and collaboration;
  - Development of a tariff setting mechanism that reflects the true cost of water, including environmental costs, to incentivise water savings.

The targets for the Water sector are summarised below:

SECTORS / AREAS	2020	2025	2030	INITIATIVES
Integrated river basin management (IRBM)	-	10% (freshwater abstraction rate)	15% (freshwater abstraction rate)	Widening area covered by IRBM
Water utilisation technology	WEPLS will be mandatory by 2019	-	-	• Formation of R&D&C fund among private players and strengthening of existing Government funded R&D&C mechanism for water sector • Educational-based promotion and awareness programmes and enhancement of WEPLS • Long-term plan in matching water demand and supply at an effective water tariff rate
Water treatment and distribution technology	-	25% (NRW)	20% (NRW)	• National NRW Reduction Program • Water Demand Management Master Plan

*Information taken from the GTMP.

Water Sector Transformation 2040 (WST 2040)

WST 2040 is a national agenda to transform the water sector into a dynamic and vibrant economic sector that can contribute significantly to the national GDP. It also seeks to provide good quality affordable water to the population as well as create new job opportunities and facilitate resilient development of STIE & RDIC.

The 8 Key Takeaways from this agenda are:

- Significant improvement in the overall understanding of the Integrated Water Resources Management (IWRM) concept across all levels and involving all sectors to ensure its effective implementation in sustainably managing the nation's water resources;
- Establishment of a national Data and Research, Development, Commercialisation, and Innovation (RDCI) Centre for the purposes of strategic planning and decision-making as well as to develop local expertise and innovative technologies in the water sector;
- Preparation of the water sector towards implementing IR4.0 and the use of smart technologies;
- Sustainable management of water resources through implementation of the Water-Food-Energy Nexus;
- Preparation of comprehensive and quantitative data regarding current water demand and needs to establish water footprints and determine water usage by every economic sector;
- Societal preparation to face the impact of climate change on the water sector;
- Development of new business and financing models to drive the nation's water industry sector to be competitive, attractive, and profitable; and
- Implementation of strategic programmes to position the water sector as a new national economic sector.

The national targets are extracted below:

*Information taken from the WST 2040.

REGULATIONS

Suruhanjaya Perkhidmatan Air Negara (SPAN) is a technical and economic regulatory body that regulates the water services industry through the implementation of Water Services Industry Act 2006 (Act 655). The Commission regulates all entities in the water supply and sewerage services industry including public and private water supply and sewerage services operators, water supply and sewerage contractors, permit holders and suppliers of water and sewerage products.

All suppliers of water and sewerage products need to be incorporated in Malaysia and registered with the Companies Commission of Malaysia/SSM: the definition of a supplier being "manufacturer, importer or distributor of an installation, a device or an equipment, including agent or representative that supply or distribute the above to any consumer, but does not include a retailer".

- A potential supplier should submit an application to SPAN to be registered as a supplier, providing certifications from approved bodies as well as a conformity assessment report and all other details as required by SPAN.
- Separate applications for product registration must be made per installation/device/equipment. (Note: all SPAN submissions and registrations are free of charge.)
- Once approved the registration is valid for 3 years, and renewals should be made within 3 months before the expiration date.
- In the cases of change of suppliers, SPAN should be notified in writing and the supplier will be removed from the register and cease distribution.
- Full regulations can be found here: Water Services Industry (Registration of Supplier) Rules 2023.

Under the Water Services Industry Act 2006 is the Water Services Industry (Water Services Deposits, Fees And Charges) Regulations 2014, which defines the charges for services.

All other regulations can be found here: https://www.span.gov.my/article/view/peraturan including updates for Licensing, Desludging, Service Charges, and Offences. All rules including Planning, Design, Construction of Septic Tanks and Sewerage Systems, Permits, and Water Services and Supply Agreements can be found here: https://www.span.gov.my/article/view/kaedah.

Other relevant water quality standards include:

- National River Water Quality Standards and River Water Quality Index
- Malaysian Marine Water Quality Standards and Index
- National Groundwater Quality Standards and Index

OUTLOOK & OPPORTUNITIES

According to Frost & Sullivan, the outlook of the water industry is expected to remain positive, as efforts will be intensified on reduction of non-revenue water, revitalisation of water infrastructure and services in urban areas, and new water infrastructure in rural areas. Nevertheless, with the exception of Sabah and Sarawak, it is unlikely that new WTPs will be built in the short term.

In the 11th Malaysia Plan (11MP) 2016-2020, the government aimed to expand the network and capacity of treatment plants through infrastructure investment and efficient technology, especially in rural or stressed areas. The plans included construction or upgrades of treatment plants, focusing in particular on states with low reserves of water supply such as Kedah, Selangor, and Negeri Sembilan. Projects that have since been completed include the Kulim Hi-Tech Water Treatment Plant and Batu Kitang WTP, while the Langat 2 WTP, a major water supply project for the Klang Valley, is currently partially operational. The water treatment plant itself is functional, but the distribution system covering the western and southern corridors is still under construction.

Malaysia is expected to accelerate efforts in reducing NRW, especially water physical losses, or leaks. Efforts by the government to tackle this problem include approved investments of almost RM 1.4 billion in 2018 to rehabilitate the water system. In the Malaysian Budget 2020, RM1.781 billion was allocated for water

infrastructure. Approximately RM587 million was allocated for rural water projects, of which RM470 million was for Sabah and Sarawak in East Malaysia to meet the Malaysian Government's target of 99 % access to clean water, and RM100 million for the FELDA water supply projects.

Immediate opportunities or focus areas are states with high NRW which also expect water projects in new water distribution systems for the rural population, and capacity extension of current WTPs and STPs for growing industries in those states.

In August 2020, CGS-CIMB Securities Malaysia stated that Malaysia was dealing with a RM 77 billion (USD 18 billion) backlog of water CAPEX, which covers upstream (raw water source and water treatment/production) and downstream (reservoirs, pumping stations, and distribution of pipelines in ageing and old pipes) projects. 70 % is expected to be in nationwide water resource and supply systems as well as new sources of raw water that involve the construction of dams, off-river storage, and new water treatment plants (WTPs) whilst 30 % would be for the replacement of the entire network of old asbestos cement (AC) pipes spanning 43,980 km. By the end of 2023, Air Selangor had replaced a total of 1,008.56 kilometres of old pipes since the start of their program in 2016. The annual pipe replacement target has been increased significantly, with plans to replace 150 kilometres per year starting from 2024, and further increasing to 300 kilometres per year from 2025 onwards. This acceleration aims to replace 5,000 kilometres of aging pipes over the next 15 years, ensuring a more reliable water supply infrastructure.

Potential beneficiaries of increased water infrastructure spending by the government are: Pipe suppliers and fitters, WTP contractors and construction, engineering consultants, and meter specialists.

While domestic water EPCs (Engineering, Procurement, Construction) dominate the municipal water segment, the industrial water market remains an easy target for foreign water companies.

According to IWK, they are seeking opportunities with partners to research on green technology and circular economy to provide solutions towards overall resource management especially in the water and energy industry.

PROJECTS BY STATES

Selangor
In Selangor, the state government has consolidated its water management to be more holistic and streamlined. In 2020, Selangor also allocated RM223.4 billion (USD 43 billion) for water infrastructure. Additionally, Air Selangor plans to focus on service improvements and is expected to extend consumer-friendly platforms that leverage Internet of Things (IoT) and data analytics.

As Selangor is working toward achieving a smart state status by 2025, there are also anticipated projects related to smart water management in Selangor, some of the key components being digitalisation and improvement. Renewed opportunities in smart water management in Selangor in the mid- to long-term will include:

- Water pollution control and detection
- Leak detection
- Rainwater harvesting
- Water quality monitoring
- Advanced water pipes
- Water use minimisation
- Consumer-centric mobile application

The digitalisation of Selangor's water management, especially in the above-mentioned focus areas should pave the way and open opportunities to foreign technology and solutions providers. Therefore, prospects in the rejuvenation of water facilities in Selangor are bright. Furthermore, water supply and improvements are anticipated to be part of the rural and suburban development which remains a key agenda of both the state and federal government.

In Dec 2020, Selangor's Chief Minister Dato' Seri Amirudin Bin Shari announced the state would implement a pipeline construction project to divert contaminated river water, in an effort to overcome pollution of water resources in the state. Approved in the 2021 Selangor Budget, RM200 million will be allocated for this project, estimated to take 15 months for completion. Through the pipeline, storage water from the hybrid off-river augmentation system (HORAS) and Bunded or Off-river Storage (ORS) will be pumped to the river so that the WTP would not run out of supply, and could meet demands for at least five days.

Air Selangor will continue the installation of sensors on main pipes (estimated 1,780 sensors to detect transient pressure and leakage at an early stage), as well as the utilisation of 3,000 permanent leak noise correlating loggers on reticulation pipes in 60 district meter zones (DMZs).

Sungai Klang, the third largest water catchment area in Selangor, has been identified as a new water source to increase water reserve margins in the state, through the construction of the Rasau Water Supply Scheme Project. Currently, only 7 % of the freshwater from Sungai Klang is used for portable water. This project will use the water source from Sungai Klang optimally.

The largest Off-River Storage (ORS) facility project in Malaysia is the Rasau Water Supply Scheme, being developed by Air Selangor. This significant project is intended to bolster the water supply for the Klang Valley region, including Selangor, Kuala Lumpur, and Putrajaya.

The Rasau Water Treatment Plant (Rasau WTP) is expected to produce up to 700 MLD of clean water supply during the first stage of completion in 2024, ensuring a sustainable and continuous water supply to the Klang and Petaling regions. The second stage of the Rasau Water Supply Scheme project should be completed in 2028, assuring a total production capacity of 1,400 MLD.

Currently, preparations to kickstart the development are already in place; including activities like land and soil investigation surveys, project risk review, pipe route alignment planning, land acquisition processes, and obtaining permit approval from local authorities. Air Selangor is also working with the Department of Environment who is providing advice on the ongoing environmental study.

Planned as a design-and-build project, the procurement process for the Rasau Water Supply Scheme is ongoing, with Air Selangor issuing tenders for three packages under Phase 1. These packages, valued at approximately RM4 billion, were awarded in 2022. The three packages consist of Package 1 for the water treatment plant and Packages 2 and 3 for the distribution system. The first two work packages were awarded by November 2021. The project is expected to produce up to 700 MLD of clean water supply during the first stage of completion in 2024.

Sarawak

The state of Sarawak in particular has launched more aggressive multi-year CAPEX programmes for both water distribution and treatment facilities. Sarawak, through the Sarawak Alternative Water Supply (Sawas) programme, is aiming to achieve 100 % water supply in the state by 2025 (as of Feb 2024, the overall water supply coverage in Sarawak is 85.4 %). Among the ministry efforts are to increase the number of qualified pipe fitters and mains layers.

Meanwhile, the Sarawak Water Supply Grid Programme (SWSGP) for sustainable development of the raw and treated water facilities is recorded at RM2.8 billion (USD 680 million) and involves an extension of pipelines to communities which can be connected to the existing water supply network system. The Sarawak government has also embarked on a holistic NRW management programme in order to reduce NRW to 25 %.

In April 2021, the Sarawak government announced various high impact projects were being implemented through the Rural Water Supply Department (JBALB) and Sibu Water Board (SWB) to address the water supply issue in Pulau Bruit, Mukah. These include the short, medium, and long-term projects being funded by the Sarawak government in efforts to resolve the water supply issue that has plagued the locals.

Some 46 water-related projects which are estimated to involve an overall cost of about RM6 billion have been proposed to be implemented in Sarawak during the 12th Malaysia Plan (12MP) period of 2021-2025. This includes flood mitigation, coastal flooding and erosion, estuary conservation, development of sewage treatment plants, sludge treatment plants, sewerage systems and upgrading of water treatment plants.

Water demand in Sarawak is also projected to increase to 2,400 million litres per day (MLD) on 2030, from the current demand of 2,060 MLD in 2024, based on the Sarawak Water Supply and Water Grid Master Plan. To ensure adequate reserves, Sarawak requires a reserve margin of at least 20 % of the capacity of its existing water treatment plants, however several major WTPs are operating at a low margin reserve rate: Batu Kitang WTP in Kuching is at a rate of 12 %, while Salim WTP in Sibu is only at 1 %.

The state government is promoting the upgrades of these WTPs to increase production capacity to 968 MLD and 300 MLD respectively by 2026. There are also plans for the construction of the new water treatment plant in Landeh, Kuching, with a planned capacity of 200 MLD.

The ministry is also implementing a project to replace old and dilapidated pipes in the state, involving a total allocation of RM1.085 billion. A stretch of 2,742km of old and dilapidated pipelines are still used in the water distribution system in Sarawak, which is attributed to be the main cause of the high rate of non-revenue water (average of 43 %).

Sabah

To address Sabah's water shortage, the state has put forward short- and long-term solutions, including the construction of the Kaiduan Dam in Penampang; the Kota Kinabalu Phase 3 water supply project, which is expected to serve the entire Sabah west coast; and the building of pre-sedimentation tanks and off-river storage facilities. The dam, estimated to cost about RM3 billion, has met with much opposition from the public, especially from the indigenous communities, as it will involve about 100 people from 30 families. Initially earmarked at the Mandalipau side in neighbouring Papar, the project will be moved upstream the same river to Kaiduan, as the forecast is that it will have a longer service term for the same cost, compared to the original site.

In 2024, Sabah Chief Minister Datuk Seri Hajiji Noor had set a three-year timeline to increase the water capacity through infrastructure development. The Telibong II Water Treatment Plant in Tamparuli is expected to increase the water supply capacity by 80 million litres per day (MLD) to accommodate the needs of northern Kota Kinabalu and Tuaran. The state government has also begun building a plant to increase the water supply from 40 MLD to 80 MLD in Kogopon, Papar, which is being implemented at a cost of RM380 million and is scheduled to be completed in 2026.

In addressing non-revenue water, which stands at 50 %, apart from replacing old pipes, the government will also introduce a vendor scheme to address illegal water connections especially in squatter settlements.

Kedah

As of 2024, efforts to increase the reserve margin levels in Kedah have progressed significantly. The state government, under the supervision of Chief Minister Datuk Seri Muhammad Sanusi Md Nor, has appointed contractors for the upgrade of five key water treatment plants. The projects are on track to be completed by 2026, aiming to increase the treated water reserve margin to 15 %.

In March 2021, the federal government agreed to write off the Kedah rural water supply debt of RM699 million, after the signing of the state water services industry restructuring agreement. This was to enable critical rural water supply infrastructure projects, such as the upgrading of the Lubuk Buntar Lama, Jenun Baru, Bukit Selambau and Sungai Limau water treatment plants, to be implemented through grant financing to meet consumer demand. It involves the construction of a WTP in Sidam Kiri, Kuala Muda, costing RM450 million, expected to be completed in 2027, and another in Kodiang, Kubang Pasu, costing RM550 million, which has been approved and is in the final process for work to commence.

Penang
In Penang state, water is supplied by Perbadanan Bekalan Air Pulau Pinang Sdn Bhd (PBAPP), a 100 % subsidiary of PBA Holdings Bhd, a company traded on the stock exchange. It is one of the few success stories of water privatisation.

PBAPP, also known as the Penang Water Supply Corporation, invested RM501 million in water supply projects from 2019-2021, with five main projects to be implemented. The 1,200-mm Butterworth-Penang Island Twin Submarine Pipeline, completed in March 2021, ensures more efficient delivery of treated water from the Sungai Dua Water Treatment Plant in Seberang Perai, and supplied 315MLD to bring up the island's total water supply to 708MLD.

The second major project is the Sungai Perak Raw Water Transfer Scheme (SPRWTS), which aims to reduce the state's over-dependence on taking raw water only from Sungai Muda, a shared resource with Kedah. The project timeline has made some progress, with discussions between Penang and Perak resuming in early 2024. However, the project is unlikely to start in 2024 due to pending infrastructure funding in Perak.

The other three projects involve upgrading all existing water treatment plants, reservoirs and pumping stations, replacing, and installing new pipelines and for non-revenue water management.

Other
Other sizeable water CAPEX plans include Perak's 3-year plan, estimated at RM501 million (USD 120 million), and Johor's Non-Revenue Water Reduction Programme (ANRP) is recorded at RM3.4 billion (USD 820 million). In Terengganu, SATU will start up the Bukit Berapit plant under the Northern Terengganu Project, which is capable of producing 50 MLD. The Kampung Teluk WTP in Kelantan (capacity of 30 MLD) aims to increase the reserve margin levels for the state.

Aside from the construction of new water treatment plants, the government was also upgrading existing plants to increase production capacity, as well as replacing obsolete pipes and repairing damaged and leaking service tanks.

OTHER INITIATIVES

In 2023, seven dams in Malaysia were identified as „high risk" with the potential to cause water supply problems to WTPs due to dam function failure or insufficient reserves during drought seasons. SPAN proposes increased utilisation of ORS (Off-River Storage) for water supply and flood control, rather than the construction of new dams, due to the need for extensive catchment areas. Several states have initiated preliminary studies for implementation of ORS, including Selangor, Pahang, Melaka, and Johor.

Nevertheless, in the state of Sarawak, the construction of 3 more hydroelectric dams is in planning: Sungai Tutoh in Baram district (in northern Sarawak), Sungai Gaat in Kapit district, and Sungai Belaga in Belaga district, both in central Sarawak. While the construction of these cascading dams will be taken over by private companies, the generated electricity will be distributed by Sarawak Energy Berhad (SEB), the state's energy operator.

With regards to water catchment facilities, Johor and Kedah are the most active in developing the segment:

- Kedah seeks to have the first underground water catchment facility on the island of Langkawi, with a project approved in Padang Matsirat, in cooperation with Japanese technology partners. The pilot project with a cost of RM453 million is expected to have a capacity of 50 million cubic litres of water production, and will be operational in 2028.
- As the home state to Ulu Muda, the most important water catchment area in the Northern Corridor, the Kedah state forestry department also gazetted the area to protect it from destructive logging activities in 2019.
- The Johor River Basin is a catchment area of 2636km^2 that is now facing a water crisis. To overcome this issue, a water monitoring programme has been established, as well as development of a planning framework and water quality forecast.

SUBSIDIES & FISCAL INCENTIVES IN GREEN TECHNOLOGY/ENVIRONMENT

To strengthen the development of sustainability in the nation, the Government of Malaysia will continue to provide incentives for green technology involving assets, services, and systems. To encourage the development of green technology, the government offers various incentives in the form of tax breaks for the purchase of green technologies, or income tax exemptions for the use of green technology services and systems.

The incentives cover a broader scope of green technology activities in the areas of energy, transportation, building, waste management, and supporting services. Any company which undertakes a green technology project or services activity is entitled to apply to Malaysia Investment Development Authority (MIDA) for the incentives. In order to further promote investments in the field of renewable energies, the Green Investment Tax Allowance (GITA) and the Green Income Tax Exemption (GITE) have been extended until 2026.

Green Investment Tax Allowance (GITA) for Assets or Projects
Applicable to companies that acquire qualifying green technology assets listed under the MyHIJAU Directory or carry out qualifying green technology projects (covering renewable energy, energy efficiency, green buildings, green data centres and integrated waste management activities).

The GITA incentive provides investment tax allowance for 100 % of qualifying capital expenditure incurred on green technology assets/projects from the year of assessment 2013 until the extended year of assessment 2026 and such allowance can be offset against 70 % of statutory income in the year of assessment. Unutilised allowances can be carried forward until fully absorbed. However, projects which have been approved with FiT for solar by SEDA are not eligible for the GITA for Projects.

Green Income Tax Exemption (GITE) for Services and Solar Leasing
Areas include renewable energy, energy efficiency, green buildings, green data centres, green communities, certification / review bodies and electric vehicles (EV). Services include system design and feasibility study, advisory and consultancy, testing and commissioning of renewable energy. For Solar Leasing, a new incentive launched in January 2020, the ITE is applicable for up to 10 years.

Qualifying companies must provide services verified by GreenTech Malaysia and listed under MyHIJAU. Applicants for services are eligible for income tax exemption of 70 % of statutory income from the year of assessment until the end of 2026.

Note: For both GITA and GITE, the dates considered are when the applications are received and approved by MIDA. The full conditions, latest updated procedures, guidelines and forms can be obtained from the MGTC website.

Green Technology Financing Schemes – GTFS 2.0/3.0/4.0
In addition to the abovementioned tax incentives, the Ministry of Finance had agreed to introduce the Green Technology Financing Scheme 2.0 (GTFS 2.0) for the period of 2019-2020, an enhanced version of the first GTFS in 2010 to encourage the supply and usage of green technologies.

The GTFS programmes offers financial aid to producers of green technology, users of green technology and Energy Services Companies (ESCOs). GTFS 2.0 had a total financing/funding approval amount of RM2.0 billion and offered rebates of 2 % per annum on interest and/or profit rate for the first seven years for each financing with sixty percent (60 %) government guarantee on green technology cost.

GTFS 3.0 was announced in Budget 2021, with an allocation of another RM2.0 billion. As part of the Government's agenda to support Sustainable and Responsible Investment (SRI) as well as drive green and sustainable standards in Malaysia, the scheme included supporting the issuance of SRI Sukuk and green bonds and was open for application until 31 December 2022.

The government continues to support the development of green businesses with the reinstatement of the GTFS 4.0 up to RM1.0 billion for the period until 31 December 2025. The financing scheme will continue its support to 6 key sectors which include Energy, Manufacturing, Transport, Building, Waste, and Water.

GTFS 4.0 will also continue to provide the 60 % to 80 % government guarantee on the green component cost financed by Participating Financial Institutions (PFIs) as well as the rebate of 1.5 % per annum on interest/profit rate. One of the main enhancements of GTFS 4.0 is the inclusion of Housing Developer and Low Carbon Mobility Infrastructure to be eligible for financing investments related to Building and Transportation projects. The Housing Developer and Low Carbon Mobility Infrastructure is eligible to obtain a maximum financing of RM100 million and RM50 million respectively. The financing scheme continues supports other categories such as Producer, User and ESCOs, already previously introduced in the scheme.

FURTHER ACTION: PROJECT TENDERS, PARTNERS, EVENTS, TRADE FAIRS

Even though most tenders for projects are obliged to be publicly announced (information HERE, via the Department of Irrigation and Drainage under PETRA), this is generally a difficult sector to enter into for foreign companies without a local partnership (i.e. any subsidiary should also have local representation), in particular with regards to government-related projects as (a) they would prioritise a local establishment; (b) many announcements are in the Malay language only; and (c) the tender process can be quite complicated.

Furthermore, while some private corporations are open to working with foreign partners, or using foreign technologies, they may only do a selective request for proposals. Therefore, our recommendations would be to engage with a suitable local partner that would be able to navigate the complexities of tendering for a project. This also applies for non-tender proposals, wherein you only wish to find a suitable distribution partner or local agent. For contact lists in your relevant field please write to kualalumpur@wko.at.

Finally we also suggest participation in events and trade fairs in the sector. You will find some of the key Trade Shows/Conferences below, and our office can also assist in crafting a trade mission.

1. **International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM)**
   Kuala Lumpur | 09 - 11 October 2024
   IGEM is Southeast Asia's largest trade event for green technologies and eco solutions, and is held annually. IGEM is a platform for solution providers and green energy businesses to tap into the fast expanding ASEAN market by showcasing the latest innovations to policy makers, government organisations, investors, and the general public. 2024's theme is "Race to Net Zero".

   Note: Since 2022, Außenwirtschaftscenter Kuala Lumpur has organised an Austrian Pavilion at IGEM. For registration and more information: HERE.

2. **Malaysia International Water Convention**
   Kuala Lumpur | estimated December 2025
   MIWC features companies and organisations from across the water and wastewater service industry, highlighting the latest innovations and technologies to a global audience of industry professionals, academics, and thought leaders.

3. **Asia Water**
   Kuala Lumpur | 07 – 09 April 2026
   Asia Water is the region's leading Water and Wastewater platform for developing Asia, and showcases all the latest in technology, products, and solutions from around the globe in the fields of water resources management, sewerage, industrial wastewater, purification, irrigation, and many more.

   Note: Wirtschaftskammer Österreich and Außenwirtschaftscenter Kuala Lumpur have participated in ASIA WATER with an Austrian Pavilion since 2006. Registration and more information will be available closer to the event: until then please refer HERE for updates.

For a full list of events in Malaysia, please visit: https://www.wko.at/aussenwirtschaft/malaysia-veranstaltungen or contact kualalumpur@wko.at.

6. CONTACTS – MINISTRIES, AGENCIES & ASSOCIATIONS

Malaysian Green Technology and Climate Change Centre (MGTC)
The Malaysian Green Technology and Climate Change Centre (MGTC) is an agency of the Ministry of Environment and Water (KASA) mandated to drive the country in the scope of Green Growth, Climate Change Mitigation and Green Lifestyle. MGTC implements initiatives and programs that provide specific details in achieving the long -term reduction of greenhouse gas emissions by 45 % based on Gross Domestic Product (GDP) by 2030 (from 2005), increasing the rate of contribution to GDP from green technology and the generation of 230,000 green jobs.

Malaysian Investment Development Authority (MIDA)
MIDA is the government's principal agency to oversee and drive investment into the manufacturing and services sectors in Malaysia; and to advise MITI on industry matters including the formulation of related policies. MIDA assists companies which intend to invest in the manufacturing and services sectors, as well as facilitates the implementation of their projects. The services provided by MIDA include providing information on the opportunities for investments, as well as facilitating companies which are looking for joint venture partners. They also evaluate the following applications for projects in the manufacturing sector and selected services sub-sectors: Manufacturing licenses, Tax incentives, Expatriate posts, and Duty exemptions.

Ministry of International Trade and Industry (MITI)
The Ministry of International Trade and Industry (MITI) is responsible for international trade, industry, investment, productivity, small and medium enterprise, development finance institution, halal industry, automotive, steel, and strategic trade. Their goals are to promote and strategise Malaysia's global competitiveness in international trade by producing high value-added goods and services, and to spur the development of industrial activities. MITI plans, legislates, and implements international trade and industrial policies that will ensure Malaysia's rapid development, encourages foreign and domestic investment, and promotes Malaysia's exports by enhancing national productivity and competitiveness in the manufacturing and services sector.

Ministry of Science Technology & Innovation (MOSTI)
MOSTI's goal is to transform Malaysia into a high-tech nation through Science, Technology, Innovation and Economy (STIE), and to use STIE to address national issues and challenges for sustainable development. They aim to develop local technology and innovation by strengthening policy and regulation, and provide effective and efficient STIE enablers and services through agile governance.

Ministry of Energy Transition and Water Transformation (PETRA)
PETRA encompasses the Department of Irrigation and Drainage (DID), Department of Water Supply (JBA), and Sewerage Services Department (JPP). The ministry is responsible for overall policy planning and is poised to establish a framework for the transformation of the water services sector. PETRA also looks at flood mitigation, stormwater management, dams and other water structures, water supply infrastructure, and sewerage services.

Department of Environment (DOE)
The DOE falls under the purview of the Ministry of Natural Resources and Environmental Sustainability (NRES) and is responsible for Water and Marine Management, including development of water resources, water monitoring (river, marine, groundwater) and water quality/pollution management. It also administers, coordinates and implement programs in the Water and Marine Division to meet the requirements of the Environmental Quality Act 1974, as well as International Agreements/ Treaties/ Conventions related to water and marine management.

Malaysian Water Association (MWA)
The Malaysian Water Association (MWA) brings together practitioners in the water service industries value chain. Their mix of members comes from water supply and sewerage utilities, manufacturers, consultants, contractors, suppliers, regulators, and academicians. MWA is a platform towards bringing about enhancement of the knowledge and skill of its members and promotes awareness of water issues among the public, and promotes public interests and environmental concerns. Internationally, MWA maintains links with related organisations abroad to establish networking in order to realize the water industry's common universal goals and are a Corporate Member of the International Water Association (IWA).

Indah Water Konsortium (IWK)
Indah Water Konsortium Sdn. Bhd. is Malaysia's national wastewater and sanitation company. It is a government-owned company under the Minister of Finance Incorporated, which has the task of developing and maintaining a modern and efficient sewerage system for West Malaysia. Indah Water has taken over the sewerage services from local authorities in all areas except Sabah, Sarawak, Majlis Bandaraya Johor Bahru and Majlis Perbandaran Pasir Gudang. Their mission is to help preserve the country's water resources, protect public health and provide a cleaner and safer environment.

Pengurusan Aset Air Berhad (PAAB)
PAAB is a wholly owned company of the Minister of Finance Inc., with the objective of being the holding company for the nation's water assets. PAAB forms part of the Government's efforts to restructure the water services industry in the country to achieve better efficiency and quality, as well as to ensure sustainability of the industry. Their main responsibility is to develop the nation's water infrastructure in Peninsular Malaysia and the Federal Territory of Labuan, using competitive financing sourced and obtained from private financial market. The water assets are then leased to water operators licensed by the industry regulator, Suruhanjaya Perkhidmatan Air Negara (SPAN) for operations and maintenance.

Suruhanjaya Perkhidmatan Air Negara (SPAN)
Suruhanjaya Perkhidmatan Air Negara (SPAN), the national water service commission, was set up in order to regulate the water services industry through the implementation of Water Services Industry Act 2006 (Act 655). SPAN is a technical and economic regulatory body for the water supply and sewerage services in Peninsular Malaysia and Federal Territories of Putrajaya and Labuan. The Commission regulates all entities in the water supply and sewerage services industry including public and private water supply and sewerage services operators, water supply and sewerage contractors, permit holders and suppliers of water and sewerage products.

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