Investing in Water: From Undervalued Common Good to Regulated Income — How Investors Can Take Part in the Fourth Megatrend

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Abstract

Water is the only economic good that nothing can replace — and at the same time one of the most underpriced. Four billion people experience severe water scarcity for at least one month a year, two-thirds of the world's river basins now carry too much or too little water, and with the data centres of artificial intelligence a new large consumer has arrived. This paper — the fourth of six on the great megatrends — examines the water megatrend from an investor's perspective: from hydrology through the economics of the value-price paradox to the investment programmes that regulators in Europe and America have already made binding.

The empirical picture is unambiguous: agriculture claims roughly 70 per cent of global freshwater withdrawals, a third of treated drinking water is lost in the networks, and the programmes already adopted — 104 billion pounds in Britain's five-year cycle, the EU's fourth treatment stage, America's lead pipe replacement and PFAS limits, 800 billion euros of need in Germany alone — turn scarcity into a contractually and legally underpinned order book stretching over decades.

For investors, the paper names listed companies across the water economy — exclusively large- and mid-cap names with business idea and trading venue — and screens the ETF selection against a fixed checklist: physical replication, fund volume of at least 0.2 billion euros, costs, the currency question, issuer, UCITS status and exchange tradability. Only three European water ETFs pass. The most recent news comes from the industry itself: the announced combination of American

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Water Works and Essential Utilities will create by far the largest listed water utility in the Western world.

Keywords: Water · water scarcity · virtual water · water utilities · desalination · infrastructure · regulation · thematic ETFs · megatrends.

JEL codes: G11, Q25, Q54, L95.

Non-Technical Summary

No raw material is as universally needed and as cheaply priced as water. A person can live without oil, copper or lithium — without water, survival ends after three days. Yet a cubic metre, a thousand litres, costs about as much in Germany as a single espresso. This mismatch is the investment thesis of the fourth megatrend: when something indispensable becomes scarce, its value rises — and with it the earnings of those who source, clean, distribute, meter and help save water.

The scarcity is measurable: four billion people — half of humanity — experience severe water scarcity for at least one month a year, and only a third of the world's great river basins still carry normal volumes. Climate change sharpens both extremes at once: the droughts and the flash floods. And a new large consumer has arrived that nobody expected a few years ago — the data centres of artificial intelligence and the chip plants, which demand cooling water on the scale of entire cities.

For investors this becomes an investment programme with advance notice: Britain has approved 104 billion pounds of water investment for 2025 to 2030, the EU requires a fourth treatment stage of its sewage works, the United States mandates the replacement of millions of lead pipes within ten years, and in Germany the industry puts the need at 800 billion euros through 2044. The paper names roughly forty large- and mid-cap stocks that earn on these programmes — from America's largest water utility to the world leader in water analytics — and screens the European water ETFs against a fixed checklist: only three pass.

The most important warning comes last: water is the slowest and most regulated of all megatrends. The returns come from approved tariffs, service contracts and meter fees, not from price surges — and whoever misjudges regulation loses money even with the right theme, as British utility shares recently showed. Water belongs in a portfolio the way the element belongs in daily life: reliably dosed, widely spread and with a long horizon.

Contents

1 Introduction

In the autumn of 2025, the two largest listed water utilities of the United States — American Water Works and Essential Utilities — announced their combination. If completed as planned, a company with roughly 40 billion US dollars of market value and 4.7 million connections across 17 states will supply water and wastewater services to around 19.5 million people. A few months earlier, India had suspended the Indus Waters Treaty with Pakistan — an agreement that had survived three wars — and Ethiopia inaugurated Africa's largest dam against the declared opposition of Egypt, which depends on the Nile for over 90 per cent of its water. Three news items of a single year, one message: water has definitively become a strategic and economic resource.[2]

Among the great megatrends, water is the most peculiar. It does not become scarcer through consumption — the Earth's stock of water has been the same for billions of years — but because demand, pollution and climate change tighten usable freshwater where people live and produce. It has no world market price like oil or copper, because it is too heavy and too cheap to ship across oceans; it is traded invisibly, as "virtual water" in wheat, cotton and beef. And it is perhaps the most political of goods: a human right under the United Nations, a subject of constitutional debate — and at the same time the foundation of listed business models with billions in revenue. Precisely from this tension arises the investment question of this paper.[3]

This paper is the fourth in a series of six on the great megatrends, after the future of mobility (Rupprechter, 2026g), artificial intelligence (Rupprechter, 2026h) and urbanisation (Rupprechter, 2026i). The water theme is closely interwoven with both predecessors: the data centres of AI have become a new large consumer, and the growing cities of the South need pipes, treatment works and storage on a historic scale. The paper is written for investors and pursues three goals: to understand why a good that covers two-thirds of the planet can be scarce; to examine where this scarcity has already become binding investment programmes; and to name concretely which stocks and funds capture the field in a portfolio — expressly without any buy or sell recommendation.

The structure: The first chapter serves as an introduction. Chapter 2 presents the Earth's water stocks and their users and develops the economics of the good whose value and price diverge like no other's. Chapter 3 quantifies the scarcity, chapter 4 its sharpening through climate change. Chapter 5 deals with the largest consumer, agriculture, chapter 6 with the newest — artificial intelligence and chip production. Chapter 7 covers the networks and the adopted investment cycles, chapter 8 the technologies from desalination to the fourth treatment stage, chapter 9 prices, regulation and geopolitics. Chapter 10

[2] American Water Works / Essential Utilities: announced 27 October 2025, all-stock, pro forma roughly 40 billion US dollars market capitalisation, completion after approvals expected 2027; Indus treaty: suspended by India since April 2025; Grand Ethiopian Renaissance Dam: inaugurated 9 September 2025.
[3] On the human right to water: UN General Assembly, Resolution 64/292 (2010).

presents individual stocks, chapter 11 screens the ETFs, chapter 12 gathers the lessons, and chapter 13 closes with conclusions and an outlook.

2 How Much Water the World Has — and Who Uses It

2.1 The stock: much water, little freshwater

The Earth is the water planet, but almost all of its water is directly unusable for humans. According to the classic inventory by Shiklomanov (1993), 96.5 per cent lies in the oceans and nearly another one per cent in saline ground and inland waters; freshwater makes up only about 2.5 per cent. Of that freshwater, 68.7 per cent is locked as ice in glaciers and polar caps and 30.1 per cent sits as groundwater, often at great depth; all the world's rivers together hold six thousandths of one per cent of the freshwater. Easily accessible — in lakes and rivers — is only about 0.3 per cent of the freshwater, roughly one ten-thousandth of all water on Earth. Table 1 summarises this distribution; it is the quantitative base of the entire megatrend.[4]

Table 1: The Earth's water stocks

Stock	Share of all water	Share of freshwater
Oceans	96.5 %	—
Saline ground and inland water	ca. 1 %	—
Freshwater in total	ca. 2.5 %	100 %
of which glaciers and ice	1.74 %	68.7 %
of which groundwater	0.76 %	30.1 %
of which lakes, rivers, soil, atmosphere	ca. 0.03 %	ca. 1.2 %
Easily accessible (lakes and rivers)	ca. 0.008 %	ca. 0.3 %

Sources: Shiklomanov (1993); US Geological Survey; own compilation.
Notes: Rounded; rivers alone hold only 0.006 per cent of freshwater.

This arithmetic alone refutes two common errors. First: water is not "used up" like oil — the water cycle eventually returns every withdrawal. What is scarce is not water as such but clean freshwater in the right place at the right time; scarcity here is always a question of quality, place and moment. Second: the reserve is not the ocean — despite all progress, desalination covers only about one per cent of global freshwater withdrawals — but efficiency: a third of treated drinking water seeps unused out of the pipes, and irrigation loses up to half depending on the method. Whoever halves the losses gains more water than all the world's desalination plants deliver. Precisely there, as this paper will show, lies the megatrend's largest investment field.[5]

[4] Shiklomanov (1993), in: Gleick (ed., 1993), Water in Crisis, pp. 13-24; presentation after the US Geological Survey (2018).
[5] Desalination share around 1 per cent of freshwater withdrawals: MIT Technology Review, April 2026, based on industry data; loss rate around 30 per cent: Liemberger and Wyatt (2019).

2.2 The users: agriculture first

Who uses the accessible freshwater? Globally, according to the data of the Food and Agriculture Organization, roughly 69 per cent of withdrawals go to agriculture, 19 per cent to industry including power plant cooling, and 12 per cent to households and municipalities. Behind the world average, however, stand very different profiles, which Figure 1 compares: in India agriculture claims 90 per cent of withdrawals, in China a good 60, in the USA around 40 — there, cooling of thermal power plants is the largest single item at 41 per cent — while in Germany it takes only about three per cent, with industry and cooling above 80. The water megatrend thus wears a completely different face by world region: an irrigation theme there, an industry and infrastructure theme here.[6]

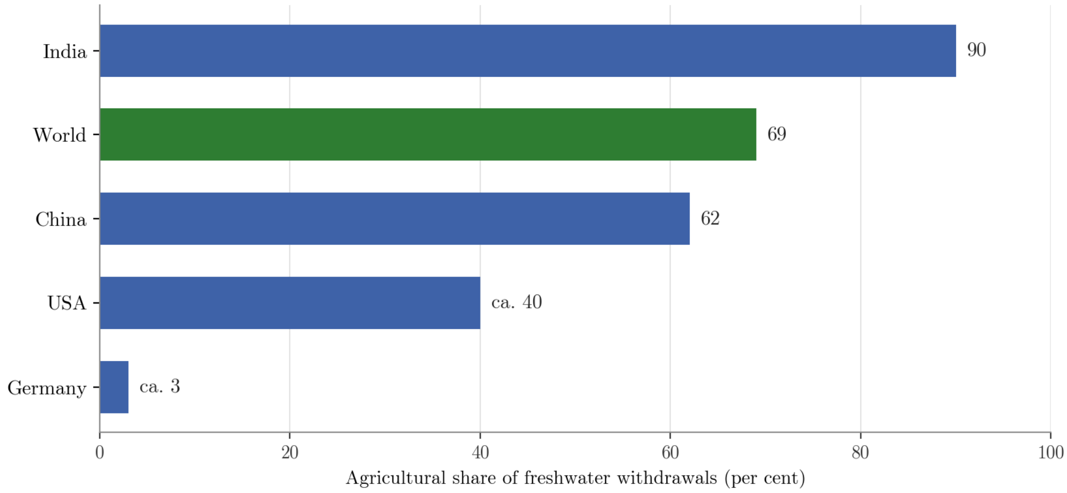

Figure 1: Agricultural share of freshwater withdrawals in selected countries and worldwide, in per cent. Source: FAO AQUASTAT; national statistics (USA: US Geological Survey, reference year 2015; Germany: Federal Statistical Office); own presentation.

For German-speaking investors the domestic starting point deserves a look, because it explains why the megatrend is often underestimated here: Germany is a water-rich country that withdraws only about an eighth of its annually available water resources — scarcity on the world scale it is not. But water wealth protects neither against dry years — as between 2018 and 2022, when Rhine and Elbe fell to historic lows and industry and inland shipping suffered — nor against the cost question of networks and treatment works that chapter 7 quantifies. For a country like Germany the water megatrend is less a quantity theme than a quality and infrastructure theme — and as an investment theme it is global in any case.[7]

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[6] FAO AQUASTAT (withdrawal-weighted world shares); India: World Bank/AQUASTAT; China: Water Resources Bulletin 2024; USA: US Geological Survey (2018), reference year 2015; Germany: Federal Statistical Office/BDEW.

[7] BDEW (2025): Germany uses roughly 13 per cent of available water resources; low-water years 2018-2022 with restrictions for shipping and power plants.

2.3 The economics: the good with the widest gap between value and price

Economically, water is a paradox older than economics itself: nothing is more valuable — and hardly anything is cheaper. Adam Smith already puzzled over the contrast of water and diamonds; the modern treatment comes from Hanemann (2006), who shows why the price of water almost nowhere reflects its scarcity: water is treated as a human right and a public service, its tariffs are set politically, its largest users — farmers — often pay next to nothing, and its transport is so expensive that no world market aligns prices. Barbier (2019) condensed this into the "water paradox": precisely because water is too cheap, it is wasted, and precisely because it is wasted, it becomes scarce. For investors this diagnosis is central, because it names the direction: the gap between value and price can only narrow over the long run.[8]

The second basic question is who owns water. Hardin (1968) described the "tragedy of the commons": a good that belongs to everyone is overused, because each individual reaps the benefit and shares the cost — the depleted aquifers of India, Iran and the American West are textbook cases. Ostrom (1990) showed the counter-thesis and received the Nobel Prize in economics for it: communities can govern water resources successfully for centuries — the irrigation cooperatives of Spain and the water courts of Valencia are her examples — when rules, monitoring and sanctions are locally anchored. Between these poles — overuse of the free good, self-governance, state regulation, private concession — every water policy in the world moves to this day; and where a society places itself on this scale decides at the same time what listed companies in the water sector are allowed to do and what is denied to them.[9]

How closely water and prosperity are linked was established by Grey and Sadoff (2007) in a much-cited paper: countries that master their water variability through storage, networks and institutions achieve "water security" — and only that makes reliable growth possible, because droughts and floods otherwise strike harvests, infrastructure and public budgets with regularity. Water security is thus a precondition of economic development, not its consequence. For investors this means: the spending this paper deals with is not a discretionary comfort that recessions strike from the budget — it is the precondition for everything else to function. That explains the extraordinary stability of demand that has traditionally distinguished the water sector on the stock exchange.[10]

[8] Hanemann (2006); Barbier (2019); Smith (1776), The Wealth of Nations, Book I, Chapter 5.
[9] Hardin (1968); Ostrom (1990), with the historical case studies of Valencia, Murcia and Alicante.
[10] Grey and Sadoff (2007), Water Policy 9(6), pp. 545-571.

2.4 Five fields of action of the megatrend

For orientation, this paper divides the megatrend into five fields of action, following the common practice of trend research, to which the chapters and — anticipating chapters 10 and 11 — the investable industries can be assigned (Table 2): the quantity problem of scarcity and rising demand; climate change as amplifier of both extremes; infrastructure with its losses and investment cycles; the technologies from desalination through reuse to the digitally monitored network; and finally regulation, pricing and geopolitics. The fields interlock — the fourth treatment stage is at once a technology and a regulation theme — but they turn the diffuse notion of "water" into concrete streams of demand with nameable beneficiaries.[11]

Table 2: Five fields of action of the water megatrend and their investable industries

Field of action	Core topics	Investable industries (examples)
Scarcity and rising demand	4 bn people under seasonal scarcity, groundwater overuse, new demand from AI and chips	Utilities, water technology, irrigation technology
Climate change as amplifier	Droughts and flash floods at once, glacier loss, risk management	Stormwater management, engineering firms, measurement technology
Infrastructure and networks	Pipe losses, lead pipes, regulators' investment cycles	Regulated utilities, pipe and valve makers, distribution
Technology	Desalination, reuse, fourth treatment stage, digital networks	Analytics and meters, membrane and process technology, pumps
Regulation, price, geopolitics	PFAS and wastewater rules, tariff cycles, interstate conflicts	Utilities in stable frameworks, environmental services, consultants

Sources: Own presentation; fields follow chapters 3 to 9.
Notes: No buy or sell recommendation; the chapters treat the fields in turn.

3 Four Billion People: Scarcity in Numbers

How scarce is water really? The most reliable answer comes from Mekonnen and Hoekstra (2016), who compared water supply and demand month by month rather than year by year — and thereby showed that annual averages systematically flatter the situation: four billion people, two-thirds of the world's population, experience severe water scarcity for at least one month a year; half a billion live with it year-round, because their region's consumption permanently exceeds renewal by a factor of two. The affected do not live only in desert states: India and China account for nearly half, and California, southern Europe and Mexico also belong to the regions with months of scarcity.[12]

[11] Division of fields following the common practice of trend and futures research; industry assignment own presentation.
[12] Mekonnen and Hoekstra (2016), Science Advances 2(2), e1500323: 4.0 billion people at least one month a year, 0.5 billion year-round.

Complementing the monthly account, the World Resources Institute counts the permanently overstretched countries: 25 states with a quarter of the world's population withdraw more than 80 per cent of their renewable supply year after year — operation at the limit, where every drought immediately becomes a crisis. The IPCC summarises the situation similarly: roughly half the world's population already experiences severe water scarcity at times. And the strain reaches beyond people: Vörösmarty, McIntyre, Gessner, Dudgeon, Prusevich, Green, Glidden, Bunn, Sullivan, Reidy Liermann and Davies (2010) calculated that 80 per cent of the world's population lives along rivers with substantially threatened water security — and that rich countries have not solved the problem but built over it with expensive infrastructure.[13]

The quietest form of scarcity lies underground. Groundwater covers about half of the world's domestic demand and a substantial share of irrigation, and in the great farming regions it is withdrawn faster than it renews: Famiglietti (2014) showed by satellite measurement that most of the world's large aquifers are shrinking — from the Ogallala beneath the Great Plains to the Indus basin and northern China. Dalin, Wada, Kastner and Puma (2017) added the trade dimension: a good tenth of this overuse is embedded in internationally traded food — whoever imports rice from Pakistan or vegetables from California imports dwindling groundwater. For this state of affairs, Gleick and Palaniappan (2010) coined the term "peak water": it is not water that is running out, but the capacity to raise withdrawals further.[14]

Alongside scarcity stands the access gap — the development face of the megatrend. According to the joint surveys of the World Health Organization and UNICEF, around 2.1 billion people live without safely managed drinking water and 3.4 billion without safely managed sanitation; the United Nations enshrined universal access as a Sustainable Development Goal of its own, and the 2026 World Water Development Report puts the question of equity at its centre. The world's largest water construction sites lie accordingly in the South: China has built the most expensive water transfer scheme in history with its South-North project, India is piping its village supply at forced pace. For Western investors these programmes are only indirectly investable — through equipment makers and engineering houses — but they set world demand for pumps, pipes and membranes for decades.[15]

One yardstick has established itself for country diagnosis: the indicator of Falkenmark (1989), which measures renewable water supply per inhabitant. Below 1,700 cubic metres

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[13] WRI Aqueduct 4.0; IPCC (2022), Sixth Assessment Report, Working Group II; Vörösmarty et al. (2010), Nature 467, pp. 555-561.

[14] Famiglietti (2014), Nature Climate Change 4, pp. 945-948; Dalin, Wada, Kastner and Puma (2017), Nature 543, pp. 700-704: roughly 11 per cent of groundwater overuse embedded in the food trade; Gleick and Palaniappan (2010), PNAS 107(25).

[15] WHO/UNICEF Joint Monitoring Programme: around 2.1 billion people without safely managed drinking water and 3.4 billion without safely managed sanitation (2025 report, 2024 data); UN Sustainable Development Goal 6; UNESCO (2026); China's South-North transfer: the most expensive water construction programme in history.

per person per year, water stress begins; below 1,000, scarcity; below 500, absolute scarcity. Entire world regions have fallen through these thresholds in recent decades — not because supply fell, but because population grew. For investors these numbers establish the theme's longevity: scarcity of this kind does not vanish with one rainy year, it is structural — and it demands exactly the investment in efficiency, storage, treatment and networks whose providers chapters 10 and 11 present.[16]

4 Climate Change as Multiplier

Climate change creates no new water scarcity — it amplifies both ends of the existing one. A warmer atmosphere holds roughly seven per cent more moisture per degree: it dries soils and rivers faster and discharges itself in fiercer cloudbursts at the same time. The World Meteorological Organization has quantified this double swing: only about a third of the world's great river basins recently carried normal volumes — two-thirds had too much or too little. The glaciers, the water towers of entire continents, lost around 450 billion tonnes of ice in 2024 alone, the third consecutive year of losses across all mountain regions; the United Nations therefore devoted its 2025 World Water Development Report expressly to mountains and glaciers.[17]

Europe has already received its object lessons. The flood of the Ahr valley and the Erft in July 2021 was, at total damage of roughly 33 billion euros, the costliest natural disaster in German history; the flash floods of Valencia in October 2024 cost more than two hundred lives and became Spain's largest insurance loss. Both events reveal the same double gap: infrastructure dimensioned for the climate of the twentieth century — and an insurance gap, for only part of the damage was covered. Both now drive demand: retention spaces, early-warning networks and more robust drainage on one side, risk modelling and debates over mandatory cover on the other. For the companies of chapter 10, adapting to too much water has become as large a business as coping with too little.[18]

The economic consequences are by now insurance statistics. Natural catastrophes cost the world around 320 billion US dollars in 2024 — the Valencia flood alone eleven billion, the central European flood a good four — and another 224 billion in 2025. What deserves note is the shift of the task: for decades, water management meant administering shortage; by now it equally means mastering excess. Retention basins, absorbent urban surfaces, early-warning sensors and larger-dimensioned sewer networks are the same industry as dams and trunk mains — only their order books grow faster. The European dimension of

[16] Falkenmark (1989), Ambio 18(2), pp. 112-118.
[17] WMO (2025), State of Global Water Resources 2024: roughly one-third of basins in the normal range, glacier loss 450 gigatonnes; UNESCO (2025), World Water Development Report “Mountains and Glaciers: Water Towers”.
[18] Ahr/Erft 2021: total damage roughly 33 billion euros (federal reconstruction fund 30 billion); Valencia 2024: roughly 11 billion US dollars, Spain's largest insurance loss (Munich Re, 2026).

this adaptation — needs of 53 to 137 billion euros a year — was treated in the third paper of this series; here the point that matters to investors suffices: both sides of the water cycle now generate demand.[19]

For the water industry itself, climate change is thus what economists call a demand shock — but one with a hard price tag for society. Every euro not spent on adaptation returns multiplied as a damage bill; the third paper of this series put the benefit-cost ratio of coastal protection at about six to one. Investors should know this asymmetry because it shapes the sector's political economy: adaptation spending can be postponed but not avoided — and the later it comes, the larger it gets. That argues for a long wave of orders, growing rather than ebbing, in precisely the fields chapters 7 and 8 describe.

5 The 70 Per Cent: Agriculture and Virtual Water

5.1 Water you can eat

Whoever thinks about water as an investment theme must first think about agriculture, for that is where the leverage lies: roughly 70 per cent of global withdrawals. Hoekstra and Mekonnen (2012) were the first to account for humanity's entire water consumption product by product — a good 9,000 billion cubic metres a year, 92 per cent of it for producing food and agricultural raw materials. Drinking and washing, the layman's first thought, are side items: a person's true water consumption flows through the plate. Figure 2 shows the orders of magnitude according to Mekonnen and Hoekstra (2012b): a kilogram of beef stands for a good 15,000 litres of water, a kilogram of poultry for a good 4,000, a litre of milk for roughly 1,000.[20]

[19] Munich Re (2026): total damage 320 billion US dollars 2024 (140 insured), 224 billion 2025; Valencia flood around 11, central European floods around 4.3 billion; EU adaptation needs: Rupprechter (2026i), chapter 4, after EEA (2026).

[20] Hoekstra and Mekonnen (2012a), PNAS 109(9): water footprint of humanity 9,087 billion cubic metres a year (average 1996-2005), 92 per cent agriculture; product values: Mekonnen and Hoekstra (2012b).

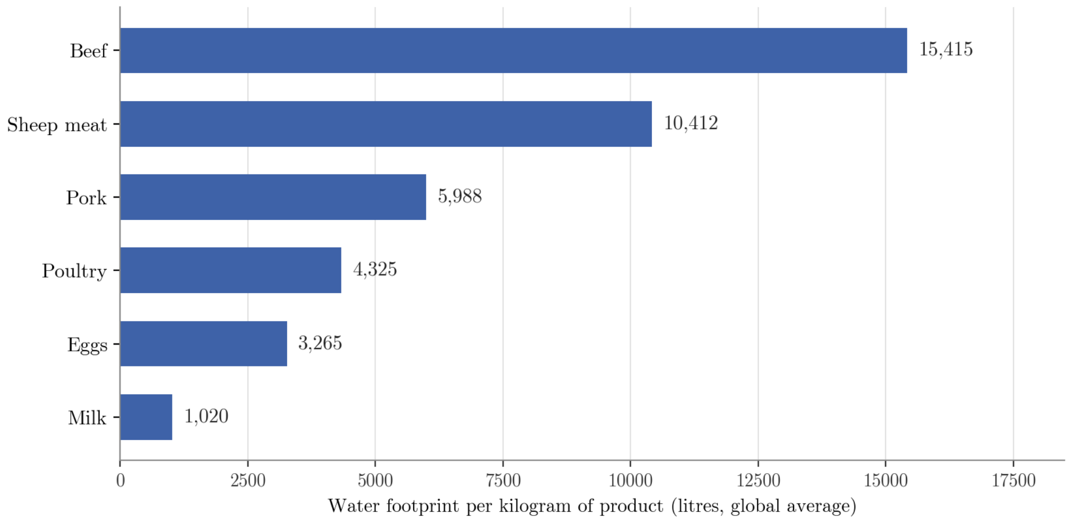

Figure 2: Water footprint of animal products per kilogram, in litres (global average; milk per kilogram roughly equals one litre). Source: Mekonnen and Hoekstra (2012b); own presentation.

From this accounting follows the notion of "virtual water": every grain ship and every meat container invisibly trades water. Water-poor countries import water in the form of food — Egypt covers a substantial part of its needs this way — while water-rich exporters ship their water as wheat and soy. This trade eases the global position overall, but it has a dark side that Dalin, Wada, Kastner and Puma (2017) uncovered: a growing share of export production rests on overused groundwater — buyer countries outsource their scarcity into the aquifers of seller countries. The balance is sustainable only where it rests on renewable water; the distinction is becoming price-relevant for agricultural investment and country risk alike.[21]

The water account does not end at the field's edge — it sits in consumer goods. A cup of coffee stands, by the calculations of water footprint research, for roughly 140 litres of water, a cotton T-shirt for about 2,500 litres, a kilogram of rice for a multiple of its weight depending on the growing region. Such numbers are no curiosity but are becoming a reporting quantity: more and more consumer goods, textile and beverage companies account for their water use along the supply chain, have it externally audited and tie financing terms to it. For investors this creates a second, indirect water asset class: the service providers of this accounting — analytics, certification, water management for industrial clients — whose largest listed representative, Ecolab, features prominently in chapter 10.[22]

[21] Dalin, Wada, Kastner and Puma (2017), Nature 543: roughly 11 per cent of global groundwater overuse embedded in the international food trade.

[22] Coffee roughly 140 litres per cup, cotton T-shirt roughly 2,500 litres: Water Footprint Network after Chapagain and Hoekstra; corporate reporting inter alia under the CDP water programme.

5.2 Efficiency as an investment field

Because agriculture is the largest user, it is also the largest saving lever — and the technology is proven. Drip irrigation brings water straight to the root instead of flooding the field and cuts consumption per yield by 30 to 50 per cent; Israel, its country of origin, today produces a multiple of its former harvest with the same water. Centre-pivot systems — the green circles seen when flying over dry regions — dose by sensor and weather data; their world market leader Valmont Industries is listed, as is the irrigation specialist Toro. Precision technology from the farm machinery groups — Deere above all — meters water plot by plot. The field has, however, a limit investors should know: several pure irrigation specialists are small caps and therefore remain unnamed in this paper; investable at scale are chiefly the machinery and technology groups named.[23]

The second source of efficiency is less comfortable, because it lies with the consumer: diet. The span of Figure 2 — a factor of fifteen between beef and milk per kilogram — means that dietary trends can move the world's water demand more than any irrigation technology. For this paper that is no occasion for lifestyle advice, but it is a pointer to the system's elasticity: humanity's water demand is not a constant of nature but a function of technology, prices and habits — and precisely for that reason it responds to the price signals and rules that chapter 9 addresses.

6 The New Large Consumer: Artificial Intelligence and Chip Production

No chapter of this series illustrates the interlocking of the megatrends better than this one: artificial intelligence, the subject of the second paper (Rupprechter, 2026h), has within a few years become a measurable factor in water demand. Data centres shed part of their waste heat through evaporative cooling — water evaporates so that chips can compute. Li, Yang, Islam and Ren (2025) quantified the need in the field's most-cited study: by 2027, AI alone is likely to withdraw 4.2 to 6.6 billion cubic metres of water a year worldwide — more than the total annual withdrawal of four to six countries the size of Denmark, and half that of the United Kingdom. Google, the most transparent large provider, reported water consumption of roughly 41 billion litres for 2025 — around seventy per cent more than two years earlier.[24]

More water-intensive still than running the data centres is making their chips. A modern semiconductor plant rinses its silicon wafers in ultrapure water that must be a thousand times purer than drinking water; the largest contract manufacturer, TSMC, uses

[23] Saving ranges of drip irrigation: FAO surveys; company information Valmont (Valley brand), Toro, Deere.

[24] Li, Yang, Islam and Ren (2025), Communications of the ACM 68(7), pp. 54-61 (first arXiv 2304.03271): 4.2-6.6 billion cubic metres a year by 2027; Google (2026), Environmental Report: roughly 10.9 billion gallons of water consumption in 2025 against 6.4 billion gallons in 2023.

around 300,000 cubic metres a day at its Taiwanese sites — as much as a city of a million people. The industry's answer is instructive for the whole megatrend: TSMC now recycles roughly 90 per cent of its process water, and since 2025 the company has additionally secured desalinated seawater under long-term supply contracts — water supply has become strategic procurement for the world's most valuable industry. Taiwan's drought of 2021, which temporarily endangered chip production, accelerated this turn.[25]

The data centre industry is responding — out of self-interest, for water is becoming a siting criterion alongside power. Microsoft announced at the end of 2024 a new data centre generation that cools in a closed loop and evaporates practically no water in operation; Google is shifting sites towards rivers with assured reuse and now reports its replenishment projects in its environmental report. At the same time political resistance is growing in dry regions — from Arizona to Aragon, new sites are being tied to water conditions. For the water sector both are demand: closed-loop cooling needs heat exchangers, treatment and chemistry; conditions need measurement and proof. The cooling equipment makers themselves were treated in the second paper of this series; here the water sector's angle counts: a new billion-euro market arises where computing and cooling must decouple from water.[26]

Behind data centres and chips stands the older, larger coupling of water and energy: power needs water, water needs power. Cooling thermal power plants is Europe's largest water user at 36 per cent of withdrawals and America's at 41; conversely, pumping, treatment and desalination rank among infrastructure's hungriest power consumers. This coupling cuts both ways in portfolios: droughts throttle power plants — France's nuclear fleet had to power down repeatedly in hot summers — and power prices set the cost of every desalination plant. Whoever holds water and energy stocks also holds their common risk; the diversification between the two fields is smaller than it looks.[27]

7 Networks, Lead and PFAS: the Adopted Investment Cycles

7.1 A third seeps away: the loss question

The single largest inefficiency of the world's water economy lies between the waterworks and the tap. By the standard estimate of Liemberger and Wyatt (2019), 126 billion cubic metres of treated drinking water never reach a paying customer each year — through burst

[25] TSMC (2026), sustainability reporting: roughly 299,000 cubic metres daily across the science parks, process water recycling roughly 90 per cent (2024), contracts for 136,000 cubic metres of desalinated water daily (2025).
[26] Microsoft (2024): announcement of zero-evaporation data centre designs; Google (2026), Environmental Report: water replenishment projects; on cooling technology Rupprechter (2026h), chapter 5.
[27] EEA: power plant cooling roughly 36 per cent of European water withdrawal (average 2000-2022); US Geological Survey (2018): thermoelectric cooling 41 per cent of total US withdrawal (reference year 2015).

pipes, creeping leaks and illegal connections, around 30 per cent is lost on the world average, a countervalue of about 39 billion US dollars year after year. The span is enormous: Singapore loses four per cent, some southern metropolises more than half. Germany, at about six per cent, stands at the top of the world — the result of decades of network care, which also shows how much there is to gain elsewhere.[28]

How differently Europe fares is shown by the view across the Rhine: France loses by official account roughly one litre in five on the way to the customer — five times the German rate — and has made leak reduction a national programme; Britain sits similarly and has set its utilities binding reduction targets in the current cycle. The first step is always the same: measure. Electronic meters and network sensors make losses visible before they can be fixed — which is why the metering waves in France, Britain and the USA have for years given the equipment makers of chapter 10 double-digit growth in this product field. The sequence is worth remembering for investors: every regulatory loss target is followed first by a measurement programme, then a construction one.[29]

Losses of this size are no law of nature but an investment gap — and the regulators have begun to close it. The clearest example comes from Britain: the regulator Ofwat has approved water investment of 104 billion pounds for the five-year period 2025 to 2030 — nearly a doubling against the previous cycle. For the listed utilities this means concrete, tariff-backed order books: Severn Trent is investing close to fifteen billion pounds, United Utilities strengthened its programme in May 2026 with an 800-million-pound equity raise. The British model — a regulated asset base earning an approved return — turns every renovation obligation into plannable earnings growth; its flip side, political pressure when performance fails, is treated in chapter 9.[30]

7.2 America: lead and PFAS as programmes of a decade

The United States long neglected its water infrastructure — the engineering association ASCE grades drinking water C minus and wastewater D plus and puts the financing gap for wastewater and stormwater management through 2044 at more than 690 billion US dollars; for drinking water supply the environmental agency puts the need at 625 billion over twenty years. Two federal programmes now turn this into binding demand. First, lead pipe replacement: the 2024 revision of the lead and copper rule obliges utilities to replace up to nine million lead service lines within ten years; 15 billion US dollars from the infrastructure act are reserved for it, and the environmental agency puts the health benefit at a multiple of the cost. Second, the forever chemicals: since April 2024, drinking water

[28] Liemberger and Wyatt (2019), Water Supply 19(3), pp. 831-837: 126 billion cubic metres a year, 346 million a day, countervalue roughly 39 billion US dollars; Germany: BDEW (2025), roughly 6 per cent network losses.
[29] France: roughly 20 per cent network losses (official figures, "one litre in five"); United Kingdom: binding leakage targets in the AMP8 cycle (Ofwat, 2024).
[30] Ofwat (2024), final determinations of 19 December 2024: 104 billion pounds 2025-2030; Severn Trent: 14.9 billion pounds; United Utilities: 800 million pound equity raise (May 2026).

limits of four nanograms per litre apply to the two main PFAS compounds — concentrations only modern filtration achieves.[31]

For investors the PFAS rule deserves a special note: it survived the change of administration. The new administration confirmed the limits for the two lead substances in 2025/26 and merely moved the deadline from 2029 to 2031, while rules for secondary substances are to be withdrawn. The costs — about one and a half billion US dollars a year by official estimate, twice that by industry estimate — flow into activated carbon and membrane plants, analytics and monitoring: revenue for the equipment makers of chapter 10, refinancable asset base for the regulated utilities. Germany, finally, shows the theme's scale in Europe's richest water country: the municipal associations put the renewal needs of the water and wastewater industry at 800 billion euros through 2044 — four times today's investment pace.[32]

Table 3 brings the adopted programmes together. Their common point: unlike most megatrends, the investor here need not venture a forecast of technology or consumer trends — the demand of the coming ten to twenty years stands in statute books, tariff rulings and court settlements. The risk lies not in the whether but in the how of delivery: permitting pace, construction capacity, skilled labour, and the question of which costs regulators allow onto tariffs.

Table 3: Adopted water investment programmes in Europe and the USA

Programme	Core content	Volume / deadline
United Kingdom: AMP8 (Ofwat)	Five-year cycle of the regulated utilities; networks, treatment works, overflows	£104 bn, 2025-2030
EU: Urban Wastewater Directive 2024	Fourth treatment stage against micropollutants; producers pay at least 80 % of the costs	20 % by 2033, 60 % by 2039, 100 % by 2045 (plants from 150,000 p.e.)
USA: lead pipe replacement (LCRI)	Replacement of all lead service lines; USD 15 bn of federal funds reserved	up to 9 m lines, within 10 years from 2027
USA: PFAS limits	4 nanograms per litre for PFOA/PFOS; filter and analytics retrofits	compliance by 2031; ca. USD 1.5-3 bn a year
EU: Water Resilience Strategy	Efficiency target and leakage reduction; non-binding framework	+10 % efficiency by 2030; >EUR 15 bn 2025-2027
Germany: municipal renewal needs	Networks, treatment works, climate adaptation (association estimate VKU)	ca. EUR 800 bn, 2025-2044

Sources: Ofwat (2024); Directive (EU) 2024/3019; EPA (2024, 2026); European Commission (2025); VKU (2025); own compilation.
Notes: p.e. = population equivalents. Volumes partly estimates; no buy or sell recommendation.

[31] ASCE (2025), Report Card: drinking water C minus, wastewater D plus; gap for wastewater and stormwater more than 690 billion US dollars through 2044, drinking water need 625 billion over twenty years per EPA survey; EPA (2024), Lead and Copper Rule Improvements (October 2024) and PFAS limits (April 2024).
[32] EPA (2026), PFAS proceedings: limits for PFOA/PFOS retained, deadline extended to 2031; VKU (2025): 800 billion euros 2025-2044 (association estimate).

8 Desalination, Reuse and the Fourth Treatment Stage

8.1 Drinking the sea: desalination

The most elegant-looking answer to scarcity is desalination: the ocean is inexhaustible, the technology proven. Worldwide, depending on the count, 18,000 to over 20,000 plants are in operation, with capacity in the range of 100 to 130 million cubic metres a day — the industry databases diverge, which is why this paper deliberately quotes ranges. The technical progress is beyond dispute: reverse osmosis has largely displaced the thermal processes, and the best large plants produce drinking water for under 0.50 US dollars per cubic metre — a fraction of former costs. Entire states now live on it: in the Gulf monarchies up to 90 per cent and more of drinking water comes from the sea, and Israel now covers around four fifths of its drinking water from desalination plants.[33]

Yet desalination remains a supplement, not a solution: it covers only about one per cent of global freshwater withdrawals. The reasons are physical — it needs much power and thus stands in league with the energy question of chapter 6 —, ecological, because the brine must be disposed of, and geographical, because seawater does not help the fields of inner Asia. For investors a market peculiarity adds itself: the purest desalination names are either small caps or state-owned; listed exposure runs above all through the large plant builders and operators such as ACCIONA and Veolia, the membrane technology of groups such as DuPont, and the process technology of Alfa Laval or Andritz — names that chapter 10 lists.[34]

8.2 Reuse: the water that is already there

More economical than producing new water is usually to use used water once more. The models are two small countries under water pressure: Israel returns 85 to 90 per cent of its wastewater to agriculture — by far the highest value in the world — and Singapore covers roughly 40 per cent of demand with its treated “NEWater”. Both show that the limits of reuse lie not in technology — multi-stage membrane filtration and UV treatment deliver water beyond drinking standards — but in infrastructure and acceptance. California, Texas and southern Europe are following the same path; the EU has specifically regulated reuse for irrigation. For the equipment makers, every reuse plant is a package of pumps, membranes, sensors and chemistry — the field of the companies in Table 5.[35]

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[33] Plant numbers and capacity: ranges after the EU Blue Economy Observatory, industry associations and MIT Technology Review, April 2026; best large plants below 0.50 US dollars per cubic metre; Gulf states and Israel: national figures.

[34] Desalination share around 1 per cent: MIT Technology Review, April 2026; on ACCIONA and Veolia as plant builders and operators: company information.

[35] Israel: 85-90 per cent wastewater reuse (chiefly agriculture); Singapore: PUB, NEWater roughly 40 per cent of demand.

8.3 The fourth treatment stage: Europe's quiet mega-project

The most consequential European water decision of the decade carries an unwieldy name: the recast Urban Wastewater Treatment Directive of 2024. For the first time it obliges large treatment works to run a fourth stage that removes micropollutants — pharmaceutical residues, cosmetics, trace substances — phased until full coverage in 2045. The financing is remarkable: for the first time an extended producer responsibility applies — pharmaceutical and cosmetics makers must bear at least 80 per cent of this stage's costs. For the water industry this is a Europe-wide retrofit programme spanning two decades: activated carbon, ozonation, membranes, analytics — and for the equipment makers an order book that hangs not on the business cycle but on deadlines in the official journal.[36]

With the fourth stage Europe is not entering wholly new territory: Switzerland has required micropollutant removal since 2016 and has been retrofitting about a hundred of its treatment works with ozonation and activated carbon — financed through a dedicated wastewater levy. The Swiss experience supplies the EU with the blueprint in technology and costing, and the equipment makers with a decade's head start in reference projects. The cost relation deserves note: the fourth stage raises the price of wastewater treatment by a low double-digit euro amount per inhabitant and year — much money in total, little per household. Precisely this relation makes micropollutant rules politically feasible and their order streams correspondingly reliable.[37]

8.4 The digital network

Across all fields lies the digitalisation of the networks — called "smart water" by practitioners. Its parts are unspectacular and effective: electronic meters that record consumption by the hour and recognise leaks in night-flow patterns; pressure sensors and acoustic loggers that locate bursts before the road caves in; satellite imagery that detects moisture signatures above leaking pipes; and models that mirror networks as digital twins. The field's market size is estimated at 15 to 50 billion US dollars depending on the house — a span that counsels caution towards all market forecasts — but the direction is clear, for every rule in Table 3 demands measurement, proof and documentation. The listed providers — from the metering specialist Badger Meter through Xylem and Veralto to the British instruments group Halma — appear in chapter 10.[38]

[36] Directive (EU) 2024/3019: fourth treatment stage for plants from 150,000 population equivalents — 20 per cent by 2033, 60 per cent by 2039, 100 per cent by 2045; extended producer responsibility of at least 80 per cent of costs.
[37] Switzerland: waters protection legislation with a micropollutant stage since 2016, roll-out at roughly one hundred plants, financed by a dedicated levy.
[38] Market estimates for smart water: 15-50 billion US dollars depending on scope and house (range documented); satellite leak detection operational at ASTERRA, among others.

9 Price, Regulation and Geopolitics

9.1 What does water cost — and what should it?

The water paradox of chapter 2.3 is slowly resolving — through price. Water and wastewater charges have for years risen faster than consumer prices in most industrial countries, because renovation, micropollutant rules and climate adaptation must be paid for; in Britain the regulator allowed tariff increases of a third and more for the current five-year cycle. At the same time water remains politically protected: as a human right and a good of basic provision it is nowhere left to the free market, and attempts to make it a financial asset remain marginal — the California water futures introduced in 2020 are barely traded and serve more as a political talking point than a price signal. For investors an important clarification follows: one does not invest "in water" as in gold, but in the companies that source, clean, distribute and meter water — in services and technology, not in the raw material itself.[39]

The economics literature sets the direction of travel for prices. Olmstead (2010) shows that water quality carries classic externalities — third parties bear the costs of pollution — so that without rules there is systematically too much polluting; the fourth treatment stage with its producer liability is the direct application of this insight. Hanemann (2006) and Barbier (2019) explain why prices should reflect scarcity and historically have not. For investors the conclusion is sober: driven by regulation rather than the market, the sector is moving towards cost-covering and scarcity-nearer prices. Every step of that path enlarges the economic base of the companies the next chapter presents.[40]

What happens when regulation and capital discipline part ways is on display in Britain with its largest utility: Thames Water — not listed, but the industry's benchmark case — piled up debts of over fifteen billion pounds under changing financial owners while leaks and sewage overflows made headlines, and has since been wrestling with recapitalisation at the edge of insolvency. The lesson for investors cuts both ways: on the one hand the case shows that regulated water business is by no means risk-free — leverage and operating performance decide here too. On the other it confirms this paper's selection logic: the listed utilities with conservative balance sheets — from American Water to Severn Trent — are the sector's quality layer precisely because the capital market audits them continuously.[41]

[39] Nasdaq Veles California Water Index futures (CME, since December 2020): thin liquidity; the literature treats the contract as an instructive but little-used experiment.
[40] Olmstead (2010), Review of Environmental Economics and Policy 4(1), pp. 44-62; Hanemann (2006); Barbier (2019).
[41] Thames Water: net debt above 15 billion pounds, ongoing recapitalisation proceedings (as of 2025/26, press reporting and Ofwat proceedings).

9.2 Water as a question of power

Where rivers cross borders, water becomes foreign policy. Three current theatres show the span. India suspended the Indus Waters Treaty with Pakistan — concluded in 1960 under World Bank mediation and honoured through three wars — in April 2025; four-fifths of Pakistani agriculture hangs on that river system. Ethiopia inaugurated its great Nile dam in September 2025 without agreement with Egypt, which draws over 90 per cent of its water from the Nile. And on the Colorado, whose water seven US states share, the federal government in the summer of 2026 for the first time set binding cuts for the lower basin after the states failed to agree. The three cases show the same basic rule: where water grows scarce, questions of allocation migrate from engineering into politics — and political risks of this kind cannot be diversified away, but they can be avoided: no name in this paper depends materially on a single interstate river regime.[42]

10 Individual Stocks across the Water Economy

10.1 Selection principles

The following overviews name listed companies whose business hangs substantially on water — grouped into regulated utilities (Table 4), technology and analytics (Table 5), and infrastructure, engineering and irrigation (Table 6). Only large- and mid-cap names from roughly two billion US dollars are included; well-known pure water specialists below this threshold — among them makers of energy recovery devices for desalination, Caribbean desalination utilities and traditional German pump houses — deliberately remain unnamed, because thin liquidity and sparse analyst coverage create risks of their own. Two rules of honesty apply in addition: for mixed groups the water share is stated rather than declaring them water stocks wholesale, and the mention is expressly no buy or sell recommendation. As a reminder of the base statistics: Bessembinder (2018) showed that the equity market's entire excess return stems from a few per cent of names — selection does not replace diversification.[43]

A word on the character of returns before names follow. Water stocks are classic quality names: below-average volatility, reliable dividends, high valuations in rate-cutting phases and headwinds when rates rise — regulated utilities trade on the exchange like very long bonds with a growth premium. The technology names of the field swing harder but carry the structural growth of the programmes in Table 3. For portfolio architecture this means: the utility layer takes on the role of a bond rather than of a growth stock — and precisely

[42] Indus: suspended since April 2025; GERD: inaugurated 9 September 2025; Colorado: federal framework of 31 July 2026, finalised 21 August 2026, with mandatory cuts from 2027 (Arizona 760,000, California 440,000, Nevada 50,000 acre-feet a year).
[43] Bessembinder (2018), Journal of Financial Economics 129(3), pp. 440-457.

that makes it valuable as an addition, because its earnings run little in step with the technology part of the market.

10.2 The regulated utilities: income from the tariff ruling

Regulated water utilities are the foundation of the theme: they earn an approved return on their network investment, and since chapters 7 and 8 described an investment obligation spanning decades, their earnings base grows with unusual predictability. The sector is visibly consolidating: in the USA, American Water Works and Essential Utilities are combining into by far the largest listed water utility of the Western world — the deal is announced and passing through state approvals —, Brazil has privatised its São Paulo utility Sabesp, and the Californian veteran SJW has traded as H2O America since 2025. The British utilities stand for the other side of the same coin: enormous approved programmes, but political pressure over sewage overflows and leverage — regulation gives, regulation takes.[44]

[44] American Water Works / Essential Utilities: all-stock, pro forma roughly 40 billion US dollars, completion after state approvals expected 2027; Sabesp: privatised 2024/25; SJW Group: H2O America (Nasdaq: HTO) since May 2025; moved from the NYSE to Nasdaq in November 2024.

Table 4: Regulated water utilities — large- and mid-cap names

Company	USD bn	Business idea in the megatrend	Traded on
Veolia Environnement	29	World's largest water and environmental services group; operations, treatment, desalination	Euronext Paris
American Water Works	27	Largest listed US utility; combination with Essential Utilities announced	NYSE
Sabesp	17	Water and wastewater for greater São Paulo; privatised 2024/25	NYSE (ADR) / São Paulo
United Utilities	14	Regulated utility of north-west England; AMP8 programme	London
Severn Trent	12	Regulated utility of the English Midlands; £12 bn investment to 2030	London
Essential Utilities	11	US water and gas utility (Aqua); to be absorbed in the American Water combination	NYSE
Guangdong Investment	7	Supplies the bulk of Hong Kong's drinking water (Dongshen system)	Hong Kong
ACEA	5	Water and energy utility of Rome and central Italy	Milan
American States Water	4	Californian utility; long-term contracts on US military bases	NYSE
Badger Meter	4	Water meters and network analytics — the metering specialist among utility suppliers	NYSE
California Water Service	3	Regulated utility in California and three further states	NYSE
Pennon Group	3	South-west English utility (South West Water)	London
H2O America	3	Californian-Texan utility (formerly SJW Group)	Nasdaq

Sources: Market capitalisations (rounded) end of August 2026; own compilation.
Notes: No buy or sell recommendation; selection without claim to completeness. Badger Meter is an equipment maker, listed here for the utility-proximity of its business.

10.3 Technology and analytics: the outfitters of scarcity

The second group earns on every programme in Table 3, whichever utility delivers it. At its head stand three names: Xylem, after the takeover of Evoqua the world's largest pure water technology group — pumps, treatment, smart meters; Ecolab, whose Global Water segment supplies roughly half of group revenue and sells water saving to industrial customers from food plants to data centres; and Veralto, spun off from Danaher in 2023, with the analytics brands Hach and Trojan the world leader in water quality measurement — whoever must meet PFAS limits can hardly avoid this instrumentation. Behind them follows the breadth of specialists from building valves to ultrapure water plants for chip factories; Table 5 names them with their fields. Honesty demands two footnotes: Pentair earns almost two-fifths of its revenue from swimming pool equipment, and Danaher itself has not been a water stock since the Veralto separation.[45]

[45] Xylem: Evoqua takeover 2023; Ecolab: Global Water segment since 2025, roughly half of revenue; Veralto: separation from Danaher September 2023; Pentair: pool business 37 per cent of revenue (2025).

Table 5: Water technology and analytics — large- and mid-cap names

Company	USD bn	Business idea in the megatrend	Traded on
Ecolab	80	Water and hygiene chemistry; Global Water segment roughly half of revenue	NYSE
Xylem	26	Largest pure water technology group: pumps, treatment, meters, analytics	NYSE
Alfa Laval	25	Heat exchangers and separators, incl. desalination and wastewater	Stockholm
Veralto	24	Water analytics and disinfection (Hach, Trojan); Danaher spin-off 2023	NYSE
DuPont	18	FilmTec membranes for reverse osmosis and desalination (partial business)	NYSE
Halma	18	Measurement and safety technology, incl. water quality and leak detection	London
IDEX	17	Dosing and fluid technology for water and process industries	NYSE
Ebara	14	Japanese pump group; today also strong in semiconductor equipment	Tokyo
Watts Water	12	Valves and safety devices for building water	NYSE
Flowserve	10	Industrial pumps and valves, incl. water and desalination	NYSE
Pentair	10	Water treatment and filtration; 37 % of revenue pool equipment	NYSE
Andritz	9	Solid-liquid separation for municipal and industrial wastewater	Vienna
A.O. Smith	8	Water heating and treatment systems (USA, China)	NYSE
Zurn Elkay	8	Drinking water dispensers and building water technology — a pure water name	NYSE
Sulzer	7	Pumps and wastewater technology (ABS brand)	SIX Zurich
Kurita Water	6	Industrial water treatment; ultrapure water for chip plants	Tokyo
Georg Fischer	5	Piping systems for water and gas (GF Piping)	SIX Zurich
Rotork	5	Actuators for valves in water and wastewater networks	London
Franklin Electric	5	Submersible pumps for groundwater and well systems	Nasdaq
Mueller Water Products	4	Hydrants, valves and leak detection for US utilities	NYSE
Organo	4	Ultrapure water plant engineering for semiconductors and pharma	Tokyo

Sources: Market capitalisations (rounded) end of August 2026; own compilation.
Notes: No buy or sell recommendation; selection without claim to completeness.

10.4 Infrastructure, engineering and irrigation

The third group builds, plans and supplies. It includes the distributors whose warehouses stand between maker and site — Ferguson and Core & Main earn on every metre of pipe in the lead replacement programme —, the stormwater specialists such as Advanced Drainage Systems, whose retention and infiltration systems address the flash flood side of climate change, and the great engineering houses Jacobs, AECOM, Stantec, WSP, Tetra Tech and Arcadis, which plan and supervise water programmes — their order books are an early indicator for the whole sector. To these add the irrigation and farm technology groups of chapter 5 and ACCIONA as one of the world's largest desalination plant builders. Table 6 brings the group together.

Table 6: Infrastructure, engineering and irrigation — large- and mid-cap names

Company	**USD bn**	**Business idea in the megatrend**	**Traded on**
Ferguson	44	Largest North American distributor of plumbing and waterworks products	NYSE
WSP Global	19	Engineering and consultancy group with a global water practice	Toronto
Jacobs	15	One of the world's largest water planning practices	NYSE
ACCIONA	14	Builds and operates desalination and water plants worldwide	Madrid
Advanced Drainage	10	Stormwater management: retention and drainage systems	NYSE
Toro	10	Irrigation and landscaping technology	NYSE
Valmont	9	World market leader in centre-pivot irrigation (Valley brand)	NYSE
Tetra Tech	9	Engineering consultancy focused on water and environment	Nasdaq
AECOM	9	Global infrastructure planning, large water practice	NYSE
Stantec	8	Planning group; water among its largest divisions	Toronto/NYSE
Core & Main	8	US specialist distributor of water, wastewater and stormwater products	NYSE
Arcadis	4	Planning and consultancy house for water and resilience	Amsterdam

Sources: Market capitalisations (rounded) end of August 2026; own compilation.
Notes: No buy or sell recommendation; selection without claim to completeness. Deere (precision farming) is treated in chapter 5.

Across the three tables it is striking what the water theme lacks and what distinguishes it. It lacks the platform giant: no company dominates the field, market shares are fragmented, and the largest pure water technology name weighs, at 26 billion US dollars, less than a single per cent of the largest AI group. What distinguishes it is stability: no name in the tables lives off a product cycle or a technology bet; they all live off rules, replacement needs and fee schedules. The water sector is thus the defensive counterpart to the growth-driven megatrends of this series — which also describes its limit: price multiplications are the exception here, steady earnings the rule.

11 Water ETFs: Three Pass the Test

11.1 The checklist

For investors who prefer to hold the megatrend diversified rather than through single names, the same checklist applies as in the preceding papers of this series. First, the replication method: physical — the fund actually holds the index stocks — is preferable to synthetic replication via swap contracts. Second, fund volume: at least 0.2 billion euros, so that the fund is economically viable and does not get closed — in the water segment no theoretical worry, as will be seen shortly. Third, running costs (management fee and total expense ratio). Fourth, the currency question: hedged share classes do not currently exist for the large water funds — investors carry the currency risk of the predominantly American and British index names, bearable over the long run but worth knowing. Fifth the issuer, sixth the UCITS framework, seventh continuous exchange trading.

The offering is more modest than the theme's popularity would suggest: only three European water ETFs clear the volume threshold — iShares Global Water as the largest and oldest, the Amundi water fund (known as Lyxor World Water until the takeover) and the equal-weighted L&G Clean Water. Little follows behind: the Global X water fund and an Xtrackers product remain small at double-digit millions, and Deka launched its water ETF only in December 2025. That the threshold is to be taken seriously, the field itself proves: an early water ETF from Invesco/PowerShares was liquidated for lack of volume. The two large American water funds, in turn — together roughly four billion US dollars — are effectively unavailable to European retail investors for lack of European key information documents.[46]

[46] Liquidated predecessor: PowerShares Global Water UCITS ETF (Invesco); US funds: Invesco Water Resources (PHO) roughly 2.1 and First Trust Water (FIW) roughly 1.9 billion US dollars — not accessible to EU retail investors without a PRIIPs document; Deka STOXX Future Water ESG: launched 17 December 2025.

Table 7: Water ETFs under European law compared (UCITS)

ETF (short name)	Volume (EUR m)	Fee p. a.	Replication	SFDR	0.2 bn met?
iShares Global Water	ca. 1,850	0.65 %	physical	Art. 8	yes
Amundi MSCI Water ESG Screened	ca. 1,520	0.60 %	physical	Art. 8	yes
L&G Clean Water	ca. 665	0.49 %	physical	Art. 9	yes
Global X Clean Water	ca. 22	0.50 %	physical	Art. 8	no
Xtrackers MSCI Water & Sanitation	ca. 7	0.35 %	physical	Art. 8	no
Deka STOXX Future Water ESG	ca. 5	0.55 %	physical	Art. 8	no

Sources: Provider information and fund databases (justETF, extraETF), end of August 2026; volumes rounded.
Notes: No buy or sell recommendation. iShares and Amundi distributing (each with an accumulating second class), L&G accumulating; hedged classes not available for the three large funds.

11.2 What sits in the funds — and what that means

The three large funds capture the same theme differently. The iShares fund follows the S&P Global Water with roughly fifty names and a clear tilt to the large Americans — American Water, Xylem and Sabesp lead at roughly eight and seven and a half per cent each — making it the most concentrated and most utility-heavy choice. The Amundi fund holds a good forty names in near-equal weighting around four and a half per cent, which strengthens technology and industrial names. The L&G fund, finally, weights almost sixty names strictly equally and thus reaches furthest into the middle size classes — the broadest choice, but also the one richest in smaller names. Whoever lays the tables of chapter 10 beside the fund lists recognises high overlap: the three funds are less three different investments than three weightings of the same roughly eighty companies.[47]

Practically relevant is the distribution question: the iShares and Amundi funds distribute in their main classes — the water sector is dividend-rich, and many investors hold it precisely for the running income — but now also offer accumulating second classes; the L&G fund accumulates by design. Tax treatment follows the rules of the investor's country of residence and belongs in individual advice. One point deserves note because it differs from the technology themes of this series: hedged share classes do not exist for the three large funds — whoever does not want the dollar and sterling weight of the indices must solve it at portfolio level.

For thematic funds as a whole, the warning of Ben-David, Franzoni, Kim and Moussawi (2023) applies here too: specialised thematic ETFs are, on average, launched when a theme is popular and expensive, and disappoint risk-adjusted in the years after. The water sector

[47] Index data and top positions: provider information end of August 2026 — iShares: American Water roughly 8, Xylem roughly 8, Sabesp roughly 7.5 per cent; Amundi: Xylem, IDEX, American Water roughly 4.5 per cent each.

is less affected than fashion themes — its indices rest on profitable, dividend-paying established businesses, not on hope stocks, and the oldest fund in the table has carried its theme for almost twenty years. The ground rule stands nonetheless: the thematic fund complements the broadly diversified world portfolio (Markowitz, 1952), it does not replace it — the more so as world indices already hold the large water names from Ecolab to American Water pro rata. Whoever weighs the sustainability aspect of the water funds finds the criteria in the second paper of this programme (Rupprechter, 2026b).[48]

12 What Investors Can Learn from All This

First lesson: water is the megatrend with the surest demand and the most sluggish price. Nobody needs to forecast whether people, cities and chip plants will need water — but one does need to judge when policy lets prices become cost-covering. The sector's return arises where both meet: inescapable demand and a regulatory framework that remunerates investment. That is why there is no way around analysing regulation; in the water sector it matters more than any question of technology.

Second lesson: the adopted programmes are the core of the investment case — not the distant scarcity scenarios. Four billion people under seasonal scarcity justify the trend; what is bought, however, are order books, and those stand in Table 3: the British five-year cycle, the fourth treatment stage, lead replacement and PFAS retrofits, the German renewal needs. Whoever invests should be able to name, for each position, which of these programmes it earns on — a simple discipline that separates theme romance from business foundations.

Third lesson: efficiency beats production. The largest economically recoverable volumes of water lie not in the sea but in the losses — a third of drinking water worldwide, half of some irrigation. Meters, sensors, leak detection, drip technology and reuse are therefore the field's highest-margin and most scalable businesses, while desalination — impressive as its technology is — hangs on power prices and locations. In doubt, the equipment maker belongs in the portfolio before the producer.

Fourth lesson: in the water sector regulation is both — source of return and main risk. The same British regulator that approves 104 billion pounds can cap dividends when sewage reaches rivers; the same American agency that forces PFAS retrofits can stretch deadlines. Whoever holds utilities must follow tariff periods, conditions and the political mood of the country concerned — the weakness of British utility shares in the years of the sewage debate was no anomaly but the normal state of this business.

Fifth lesson: purity has its price — in stocks too. Pure water names are rare and often small; many of the field's most liquid names are mixed groups whose water share one

[48] Ben-David, Franzoni, Kim and Moussawi (2023), Review of Financial Studies 36(3), pp. 987-1042; Markowitz (1952); Rupprechter (2026b).

should know before assigning them to the theme. This paper has therefore stated the shares: about half at Ecolab, two-fifths swimming pools at Pentair, a partial business at DuPont and Halma. Whoever wants true theme purity gets closest through the equal-weighted funds — and pays for it there with a higher share of smaller names.

Sixth lesson: Bessembinder (2018) holds in the most defensive sector too — the majority of all stocks lag short-dated government paper over their lifetime, few carry the return. The water sector softens this risk through its stability but does not repeal it: utilities too can fail on leverage, regulatory turns or overpriced takeovers. Diversification across the three groups of chapter 10 — utilities, technology, engineering — and across currency areas remains the single most effective protection; the funds of chapter 11 deliver it in one piece.[49]

Seventh lesson: the water megatrend rewards being read together with its neighbours. The data centres of artificial intelligence (Rupprechter, 2026h) make cooling water a siting factor, the growing cities (Rupprechter, 2026i) demand networks and treatment works, and climate adaptation runs through all three papers. Whoever plans megatrend positions should know the overlaps: a water fund, an infrastructure fund and a utility single position can hold the same companies three times over — concentration can arise from nothing but broad products.

13 Conclusion and Outlook

Water is the world economy's least spectacular raw material and its most unyielding: irreplaceable, needed everywhere, underpriced almost everywhere. This paper has shown how that constellation becomes an investment theme — not through speculation on the raw material, which defies every attempt to make it an asset, but through the companies that turn scarcity into services: utilities with approved investment programmes, equipment makers for measurement, treatment and reuse, planners of adaptation to a rougher climate. The demand of the coming two decades stands in statute books; the question is not whether but who serves it, and on what terms.

The outlook: three developments deserve particular attention. First, utility consolidation — the American Water and Essential Utilities combination, once completed in 2027, is likely to prompt further takeovers in the fragmented American market, and Brazil's privatisations show emerging countries opening their water industries to private capital. Second, micropollutant regulation: with the fourth treatment stage and producer responsibility, Europe enters new territory whose cost allocation between pharmaceutical industry, ratepayers and public funds is only now being fought out — with signal effect far beyond the EU. Third, the water appetite of artificial intelligence: whether data centres shift their cooling to water-sparing designs or become the dominant new consumer will help decide how quickly water becomes a siting factor even in water-rich countries.

[49] Bessembinder (2018).

The series on the key megatrends continues with the fifth instalment, ‘Robotics and Automation’. The insight the water theme contributes is perhaps the most sobering of the whole programme: the most reliable returns of a megatrend arise not where the headlines are made, but where rules, fees and service contracts run for decades. Water does not flow quickly to riches — but neither does it run dry. In an investment world that swings between euphoria and disillusion, that is a value in itself.

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Preliminary note: Market, price and fund data without a separate reference are drawn from company statements, fund databases and the cited reports; as of end of August 2026.

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