内部资料

2025年第2期（总8期）

AQUATECH

水技术

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Aquatech was founded in 1968. As a long-established trade fair with a 100% focus on water, Aquatech Amsterdam is a unique event in Europe with a visitor attendance of 22,000+ and over 800+ exhibitors every other year.

Aquatech品牌创立于1968年。作为水处理行业历史悠久的展览会，荷兰国际水处理展览会（Aquatech Amsterdam）至今已有近60年的举办历史。展会每两年举办一次，吸引超过800家企业参展与22,000人次的观众参观。

As the global demand for water products, technologies, and solutions rises, the water treatment industry presents immense opportunities for development. With its involvement in utility, industrial, agricultural, and service sectors, this industry plays a pivotal role in achieving environmental goals. Moreover, the continuous advancement and innovation of water treatment technology opens new avenues for progress.

随着水资源的日益紧张、国内环保要求的提高以及工业与民用净水的巨大需求，水处理相关高质量产品、技术、服务的需求量不断增加，水处理行业正迎来巨大的发展机遇。同时在“双碳”政策的背景下，水处理行业作为实现绿色低碳目标与推动行业创新发展的关键领域，其应用涉及市政、工业、农业、服务业等各行各业，总体市场份额将快速增长，水处理技术也必须与时俱进。

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Industry perspective
行业观点

汇聚全球前言洞察，精选国际权威专家趋势预判、跨国企业战略动向及政策风向，涵盖绿色经济布局、技术投资热点、产业变革报告，为决策者提供战略级趋势导航。

KNOWLEDGE TWIN IMPROVES TREATMENT EFFICIENCY
知识孪生赋能水务智效

Singapore-based AI startup TeamSolve has secured an enterprise-wide operations rollout with Philippines water utility Balibago Waterworks that will use a Knowledge Twin to 'improve asset performance, operational efficiency and workforce effectiveness'.
新加坡 AI 初创公司 TeamSolve 与菲律宾水务公司 Balibago 已达成全面合作，将通过部署“知识孪生（Knowledge Twin）”系统，来实现资产性能优化、运营效率提升及员工效能增强。

Successful trial implantation of Knowledge Twin
知识孪生技术成功试点落地

The rollout follows a successful nine-month trial implementation of the TeamSolve's generative AI Knowledge Twin at Balibago Waterworks' water supply network in Capas and its water treatment plant in Arayat. The initial contract is for three years.
在菲律宾Capas市供水管网及Arayat水处理厂完成为期9个月的生成式AI知识孪生系统试点后，TeamSolve与Balibago Waterworks正式签署为期三年的合作协议。

Balibago Waterworks is the largest provincial privately owned waterworks system in the Philippines. Over the next three years, TeamSolve will partner with Balibago Waterworks to roll out the Knowledge Twin across the latter's portfolio of more than 90 franchises outside the country's capital Manila. Together, these serve approximately two million people.

Balibago 自来水公司是菲律宾最大的省级私营水务集团。未来三年，TeamSolve将协助其在首都马尼拉以外的90多个特许经营区部署知识孪生系统，服务覆盖约200万居民。

Criselle Alejandro, president of Balibago Waterworks, told media: "We know that the future is all about AI. At Balibago Waterworks, we want to ensure that we learn how to use this technology to our advantage, to provide our customers with better water service and

optimise our business through all the benefits AI can deliver."
Balibago 自来水公司总裁Criselle Alejandro向媒体表示："我们深知AI是未来发展的核心。在Balibago自来水公司，我们希望通过这项技术来提升供水服务质量，并全面优化运营效率。"

"Our goal is not to replace humans with technology, but to use AI to help our employees do their jobs better. We thank TeamSolve for guiding us through this new horizon for our business."
"但我们的目标不是用技术取代人类，而是赋能员工高效工作。感谢TeamSolve引领我们开拓业务新边疆。"

What is TeamSolve's Knowledge Twin?
TeamSolve的知识孪生是什么?

Knowledge Twin is a patented, next-generation AI powered digital knowledge companion which is tailored for utilities, commercial buildings, and industrial facilities across various sectors.
知识孪生是TeamSolve的专利技术，一种专为公共事业、商业建筑及工业设施量身定制的新一代AI驱动数字化知识伴侣。

Like a digital twin, it has been designed to integrate human expertise with data to generate advanced, on-demand insights that can enable better planning of future operations, enhance crisis response, and monitor system-wide asset health.
与数字孪生类似，知识孪生的设计目标是将人类专业知识与数据相融合，生成可即时调用的见解，从而优化未来业务规划、强化危机响应能力，并实现全域资产健康状态的实时监控。

Acting as a dynamic knowledge base, it consolidates historical asset and incident data, expert wisdom, troubleshooting manuals, operating procedures, and field findings. This is designed to empower a workforce by delivering precise information when and where it is needed, improving operational efficiency and decision-making.
作为动态知识库，它整合了历史资产数据、事故案例、专家经验、故障排除手册、操作规程及现场巡检记录。其核心价值在于，在需要的场景下为员工精准推送所需信息（如时间、地点），从而提升运营效率与决策精准度。

How has AI helped Balibago Waterworks?
AI如何助力Balibago水务公司?

Knowledge Twin helped to improve operational performance at the Balibago Waterworks largely through workforce efficiencies. It effectively consolidated various sources of knowledge to streamline access for employees, enabling safer, more efficient task performance. These included insights and standard operating procedures from domain experts, continuous field observations and findings, troubleshooting guides, safety protocols, reports and workflows.
知识孪生系统通过大幅提升员工效率优化了Balibago水务公司的运营绩效。它有效整合了多源知识，包括领域专家的见解与标准操作流程、持续现场观测数据、故障排除指南、安全规程、报告及工作流程，为员工提供统一的知识入口，确保任务执行更安全高效。

The AI was integrated into a natural language interface on WhatsApp, helping to smooth the way for Balibago Waterworks' field teams to adopt. Alongside providing a singular access point for pertinent information and insights, the tool allowed teams to perform and log workflows, and capture new knowledge through text, image and audio inputs that, in turn, helped to update the Knowledge Twin.
该AI系统被集成至WhatsApp的自然语言交互界面，大幅降低了Balibago现场团队的技术使用门槛。该工具不仅提供统一的知识访问入口，还支持团队执行并记录工作流程，同时通过文字、图片、语音等多模态输入捕获新知识，反向更新知识孪生系统。

Time was saved through the instant generation of reports, ensuring the proper documentation was gathered. During the trial, the Knowledge Twin also supported key workflows on leak surveys and repairs, water loss calculations, preventive maintenance, safety protocols and troubleshooting across all main water asset classes at the plants.
通过即时报告生成功能，确保关键数据完整归档并节省了文档整理时间。在试点期间，知识孪生系统成功赋能五大核心场景：泄漏检测维修、水损计算、预防性维护、安全协议及水厂全品类资产故障排查。

Operational improvements across all water assets
全域水务资产运营效能跃升

During the pilot period, Knowledge Base helped Balibago Waterworks gain time savings of 50 per cent for field teams, ensured work consistency and upskilling, improved scheduling efficiency by about 30-50 per cent, and decrease time needed for new staff onboarding.
在试点期间，知识库系统帮助Balibago自来水公司的现场团队节省了50%的工作时间，保障了工作流程的一致性和员工技能提升，同时将调度效率提高了约30%-50%，并大幅缩短了新员工入职培训所需的时间。

The water utility predicts the transition from reactive to proactive and predictive maintenance will improve asset performance by over 20 per cent, while also helping to reduce non-revenue water.
该水务公司预测，从被动维护模式转向主动及预测性维护后，资产性能将提升超过20%，同时有助于减少无收益水。

Robin Wong, founder and COO, TeamSolve, told media: "This partnership marks a significant milestone for TeamSolve, showcasing the transformative power of our game-changing Knowledge Twin in delivering swift and impactful results for the water sector."
TeamSolve创始人兼首席商务官（Chief Commercial Officer）Robin Wong向媒体表示："此次合作是TeamSolve的重要里程碑，展现了我们颠覆性的知识孪生技术在水务行业实现快速且显著成果的变革性力量。"

Supported by ImagineH20 funding and design
获ImagineH20资金与设计支持

The collaboration between TeamSolve and Balibago Waterworks was supported by Imagine H2O's Water Innovation Pilot Fund, which not only unlocked funding to help kickstart the pilot implementation, but also provided advisors onsite to support the project's design.
TeamSolve与Balibago水务公司的合作，获得了Imagine H2O水创新试点基金的支持。该基金不仅提供了启动试点实施所需的资金，还派遣顾问团队现场支持项目的设计。

Commenting on LinkedIn, Imagine H20, said: "We're excited to continue partnering with TeamSolve in the region to transform how utilities manage their water assets."
Imagine H2O在LinkedIn上评论称："我们倍感振奋，将继续与TeamSolve在本地区合作，彻底改变水务公司管理水资产的方式。"

TeamSolve was founded by CEO Mudasser Iqbal, CCO Robin Wong, CTP Michael Allen, and CPP Ami Preis. In 2024, TeamSolve raised US$2.5m through a seed funding round anchored by Singapore government-backed Deep Tech investor and ecosystem builder SGInnovate, together with Burnt Island Ventures.
TeamSolve由首席执行官Mudasser Iqbal、首席商务官（CCO）Robin Wong、首席技术产品官（CTP）Michael Allen及首席项目官（CPP）Ami Preis联合创立。2024年，TeamSolve完成250万美元种子轮融资，领投方为新加坡政府支持的深科技投资机构和生态建设者SGInnovate，以及Burnt Island Ventures。

The company also participated in the ImagineH2O Asia Accelerator programme, which played a crucial role in facilitating TeamSolve's collaboration with Balibago Waterworks and helped co-fund the pilot project.
该公司还参与了ImagineH2O亚洲加速器计划，该计划在促成TeamSolve与Balibago 水务公司的合作中发挥了关键作用，并共同资助了试点项目。

AQUA TECHNOLOGY

MENNO HOLTERMAN: CELEBRATING NIJHUIS'120 YEARS AND THE NEED FOR DECENTRALISED DESIGN THINKING
水务未来式：NIJHUIS百年与分散式设计

Menno Holterman remains bullish on the need for a system redesign when it comes to procurement and project delivery.
Menno Holterman 对采购与项目交付领域的系统性重新设计需求仍持坚持乐观态度。

The CEO of Nijhuis Saur Industries (NSI) believes that with many clients demanding solutions to be supplied "yesterday", there is an urgent need for the water sector to become more agile to deliver immediate services.
作为 Nijhuis Saur Industries（NSI）的首席执行官，他认为，由于许多客户要求解决方案必须"即刻到位"，因此，水务行业亟需提升灵活敏捷性，以提供即时服务。

"We all need to work in a different way, and apply the modular approach-thinking pioneered for industrial water applications across to the utility space," he says.
他说道："我们都需要以不同的方式开展工作，将工业水处理应用中开创的模块化方法思维延伸至市政水务领域。"

The Future is Water
水即未来

Nijhuis recently celebrated its 120 Year Anniversary, with a milestone event on the theme 'The Future is Water'. Commenting on this theme, Holterman believes that water still to this day remains undervalued, despite being a key connector.
Nijhuis近期以"水即未来"为主题举办了120周年里程碑式庆典。针对这一主题，Holterman指出：尽管水是连接万物的关键纽带，但时至今日，其价值仍被严重低估。

"The water sector is lagging behind the energy, waste and health transitions," he says. "Water connects and acts as a lubricant for all major transitions, yet many fail to grasp the interdependencies between water, energy, food, waste and health. As a business, we are zooming in on these transitions."

他表示："水务行业的转型步伐落后于能源、废物处理与卫生健康领域。水如同润滑剂，串联并驱动所有重大变革，但多数人尚未理解水与能源、食品、废物及健康之间的深度依存关系。作为企业，我们正深入聚焦这些系统性转型。"

'The Future is Water' was chosen to deliberately provoke thinking about the crucial role of water. Holterman noted the World Economic Forum's recent 'Global Risks Report', with water-related threats moving down the list and misinformation and disinformation and extreme weather events remaining a top short-term risk.
选择"水即未来"这一主题，旨在引发对水核心作用的思考。Holterman援引世界经济论坛最新发布的《全球风险报告》指出：虽然与水有关的威胁在榜单上的排名有所下降，但错误信息、虚假信息及极端天气事件仍是短期首要风险。

"Without water, it's going to be difficult to meet the challenging requirements of the top global risks," the CEO added.
这位首席执行官补充道："若无法保障水资源，我们将难以应对全球顶级风险所提出的严苛要求。"

Understanding Nijhuis's past, to help predict the future
鉴往知来：Nijhuis的历史洞察与未来预见

In order to understand the future direction of the business, it's worth reflecting on its past.
欲洞悉企业未来航向，必先溯其发展之源。

Starting life in 1904 in the rural area of Winterswijk, a small local machine shop was established under the pioneering leadership of Gerrit Jan Nijhuis. First equipping the local abattoir with state-of-the-art slaughtering technology, the company then set up a new department for the repair, design and manufacture of Nijhuis pumps. And then over the next 80 years, the company evolved.
1904年，在Gerrit Jan Nijhuis的开创性领导下，在Winterswijk的农村地区建立了一个小型的当地机械车间。公司最初为当地屠宰场提供先进屠宰技术，随后设立新部门，负责Nijhuis水泵的维修、设计与制造。此后八十年间，企业持续蜕变。

In the 1960s a new chapter began due to increasing demand for wastewater treatment in slaughterhouses driven by the implementation of regulations. Fast forward to the mid-1980s and Nijhuis Pumps was completely separated, resulting in Nijhuis Water and Nijhuis Slaughter Technique operating as independent companies.
20世纪60年代，由于法规的实施推动了屠宰场废水处理需求的增加，公司开启了新篇章。至80年代中期，Nijhuis水泵业务彻底分拆，Nijhuis水务与Nijhuis 屠宰技术成为两个独立运营实体。

A big jump forward to 2020 and French industrial company SAUR, a portfolio company of EQT, acquired Nijhuis Industries, with the ambition to become an international leading player in the industrial water business. Since then, the company has made a rapid list of 18 notable acquisitions as part of its growth strategy, including ceramic membrane company PWNT, Cirtec, Flootech, Sodai and SUEZ Industrial Water UK and Veolia's mobile water systems.

2020年迎来重大跃升——EQT投资组合公司法国工业集团SAUR收购了Nijhuis Industries，希望成为工业水处理领域的国际领军者。此后，企业通过18项战略收购加速扩张，包括陶瓷膜公司PWNT、Cirtec、Flootech、Sodai、苏伊士工业水务英国公司，以及威立雅移动水处理系统。

Life under SAUR ownership
SAUR时代：所有权赋能下的发展新章

Reflecting on the last five years since the SAUR acquisition, Holterman remains proud that the company has evolved from a "systems seller", as he calls it, through to a "full service company and solution provider". As a simple data point, it has gone from having several operation and maintenance (O&M) contracts, through to having 700 and is today Europe's largest mobile water solutions provider.
回顾SAUR收购后的五年历程，Holterman仍深感自豪：公司已从他口中的"系统设备供应商"蜕变为"全服务型解决方案提供商"。一组数据可佐证——其运营与维护（O&M）合约从寥寥数份跃升至700份，如今更成为欧洲最大的移动水处理解决方案供应商。

"We are very honoured that SAUR has given us the trust and confidence to invest significantly also into geographical and technology portfolio expansion, as well as supporting us in implementing our customer for life approach and expanding and strengthening our delivery capabilities by becoming one integrated platform," adds the CEO.
这位首席执行官补充道："我们深感荣幸，SAUR赋予我们充分信任，持续注资推动地域布局与技术组合扩张，并通过整合平台赋能，助力我们践行'终身客户服务'理念，强化全链条交付能力。"

Part of the renewed mission of NSI is to deliver "water on demand" and help customers "restore or close the natural water loop". This is part of the 4R strategy (reduce, remove, reuse and recover) and going beyond the traditional 3Rs (reduce, reuse, recycle).
NSI的新使命之一是提供"按需供水"，帮助客户"修复或闭合自然水循环"。这属于其4R战略（减量、去除、回用、再生）的一部分，突破了传统3R（减量、回用、循环）框架。

"NSI seeks to educate the world that water does not need to be of the highest quality for all applications, for example using recycled wastewater for non-potable uses such as cooling or irrigation."
"NSI致力于向全球传递理念，即并非所有场景都需要最高品质的水质，例如冷却或灌溉等非饮用用途的水完全可采用再生废水。"

Decentralised design (re)thinking
分散式设计思维的再思考

The NSI CEO believes that the modular, decentralised solution offering is one of the ways forward. Rather than default to large scale centralised infrastructure and networks "often losing 30 per cent of water through non-revenue water (NRW)", Holterman advocates for decentralised alternatives.
NSI首席执行官坚信，模块化分散式解决方案是未来重要方向之一。相较于默认选择"常因无收益水（NRW）导致30%水资源损耗"的大型集中式基建管网，Holterman力推分散式替代方案。

Often scalable, quicker and more flexible, such solutions can meet industrial and utility demands when there is an urgent need for water. "We need to redesign our strategy to be more modular and scalable in the approach," he adds. "Such

approaches, including rental and hybrid solutions are key to reducing costs and implementation times, which are also an area that needs innovation."
这类解决方案兼具可扩展性、快速响应与灵活部署优势，可以满足工业和公用事业对水的迫切需求。他补充道："我们必须重构战略，在方法论层面强化模块化与可扩展性。租赁模式、混合方案等创新路径，对降低成本与缩短实施周期至关重要——这正是亟待突破的领域。"

Furthermore, such approaches can also tap into more accessible OPEX (operational) capital, rather than traditional CAPEX (capital expenditure) budgets.
此外，此类方案可撬动更易获取的OPEX（运营支出）资金池，而非依赖传统CAPEX（资本支出）预算。

Learning from the offshore oil and gas, and also shipping industry, NSI is currently investing heavily in expanding its manufacturing capacity in the Netherlands. The ambition is to reduce the construction time onsite by handling this ahead of time at the NSI's own factory. Modular and almost completed water systems can then be delivered to start operating more quickly, thereby reducing onsite risks, construction and associated costs.
借鉴海上油气与航运业经验，NSI正重资扩建荷兰制造基地，目标是通过工厂预制造大幅缩短现场施工周期。近乎完工的模块化水处理系统运抵后即可快速投运，从而降低现场风险、施工及相关成本。

Holterman also believes more efficient business models, built on "integrated thinking and new design rules" is where there's space for further innovation to significantly shorten the traditional process from opportunity development, permitting, decision making, project design and delivery up to operations and maintenance.
Holterman还指出，基于"集成化思维与新型设计规则"的高效商业模式创新，可显著压缩传统流程周期——从开发、审批决策、项目设计、交付直至运维管理，均存在巨大优化空间。

Hampton Loade project in the UK
英国Hampton Loade项目

Clearly the agility from the innovative business model approach seen within industrial water projects could also benefit more traditional utility markets. The CEO cites a recent UK project as one such example.
显然，工业水处理项目中创新商业模式所展现的敏捷性，亦可赋能传统公用事业市场。这位首席执行官以近期英国一个项目为例佐证此观点。

The upgraded Hampton Loade water treatment works, operated by UK utility South Staffs Water, produces 210,000 m3/day, serving 700,000 customers. As part of a £55 million rebuilding and refurbishment project, a ceramic membrane-based water-filtration system was provided using technology provided by PWNT. The build time was reduced from a planned four years down to a remarkable two and a bit.
由英国公用事业公司South Staffs Water运营的Hampton Loade水处理厂升级项目，日处理能力达21万立方米，服务70万用户。作为5500万英镑重建与改造工程的关键部分，该项目采用PWNT提供的陶瓷膜过滤技术，将建设周期从原计划的四年缩短至两年零数月。

"We were able to reduce the traditional manufacturing and construction time on the Hampton Loade project, showcasing that innovation goes beyond the technology but also procurement, construction and system delivery," the CEO says proudly.
"我们在Hampton Loade项目中成功压缩传统制造与施工周期，印证了创新不仅限于技术突破，更贯穿采购、施工与系统交付全链条。"CEO自豪地表示。

Unconventional water sources and looking ahead
非常规水源与未来图景

The impacts from climate change are well known on the water industry. From drier, hotter and more scare summers through to wetter, heavier winters. Holterman believes that unconventional water sources including sea and surface water will soon start becoming conventional, out of sheer necessity.
气候变化对水务行业的影响已广为人知——从更干旱、炎热且水资源短缺的夏季，到更潮湿、降水量更大的冬季。Holterman认为，在现实需求的倒逼下，海水与地表水等非常规水源将加速成为常规选择。

As a result, NSI is supporting and educating its clients around the globe on the need for unconventional sources, including re-using processed (waste)water into drinking water.
为此，NSI正通过全球客户网络推动非常规水源认知革命，包括将经处理的（污水）水回用于饮用水生产等突破性实践。

"I think everybody is starting to realise now that just relying on natural water supply through wells and aquifers is unsustainable and will not provide sufficient water to the growing needs," he says.
他表示："如今所有人开始意识到，仅依赖水井与含水层等自然水源已不可持续，更无法满足日益增长的用水需求。"

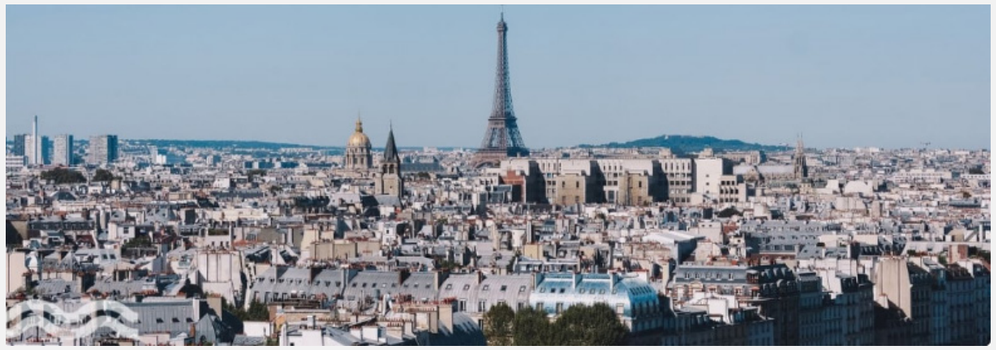
Another concern of the CEO is the increased global competition for jobs, with other transitioning sectors such as energy quite literally "buying up the talent in water". As a result, he adds that there is a need for the water sector to raise its profile to be a key voice in the larger global transitions and give water the value it deserves as part of the company's '#MissionWater' philosophy.
这位CEO的另一个担忧是：能源等转型行业正以"高薪挖角"方式争抢水务领域人才。他强调，水务行业亟需提升全球转型议程中的话语权，并通过企业"#使命之水（#MissionWater）"哲学赋予水资源应有价值。

It's clear that innovation and diversification along the way were key to Nijhuis reaching the 120 year milestone. Looking ahead, Holterman's vision of embracing modular decentralised solutions, along with innovative business models will be crucial for reaching the next level and bringing the rest of the market along with it.
显然，创新与多元化是Nijhuis跨越120年里程碑的核心动能。展望未来，Holterman提出的模块化分散式解决方案与创新商业模式双轮驱动战略，将成为引领行业升级的关键路径。

FRANCE PASSES LAW TO BAN PFAS FROM 2026
法国将成为禁用PFAS的第二个欧洲国家

The French National Assembly has passed a law that bans the use of Per- and polyfluoroalkyl substances (PFAS) in many products from 2026, making it the second European country to announce such a plan. The law also puts the cost of cleaning and destroying PFAS on the polluter rather than water utilities.
法国国民议会通过法律，规定自 2026 年起禁止在多种产品中使用全氟和多氟烷基物质（PFAS）。该法律还规定，应由污染者代替水务公司承担起处理和降解 PFAS 的任务。

The law was backed by a petition from French citizens and passed by a vote of 231 to 51. The law had already passed its first reading in the National Assembly and also the Senate.
该法律获得法国公民请愿支持，并以 231 票赞成、51 票反对通过。此前，该法案已通过国民议会的审读和参议院审议。



Ban proposed by Green MP finds wide backing
禁令得到广泛支持

The ban was first proposed in 2024 by the Green MP Nicolas Thierry. His proposal included an almost total ban on PFAS use, except in exceptional circumstances, such as for the protective clothing worn by firefighters.
绿党议员Nicolas Thierry于2024年首次提出该禁令，他建议除消防员保护服外，其他情况应全面禁止使用PFAS。

However, although the new law covers a wide range of products including cosmetics and waterproof clothing, some products that were in the original proposal — cookware — have been given an exemption.
尽管新法案中已禁止PFAS在化妆品、防水服等产品中使用，但炊具等产品仍可使用PFAS。

Under the law, a ban on the manufacture, import, export, and marketing of cosmetics, footwear, consumer textiles, and ski wax containing PFAS will become effective from January 1, 2026. The next stage will happen in 2030 when all textiles containing the substances, except for protective clothing, will be banned.
根据该提案规定，自2026年1月1日起，禁止生产、进口、出口和销售含PFAS的化妆品、鞋类、消费类纺织品以及滑雪蜡。到2030年，将全面禁止纺织品（除了防护服）使用PFAS。

Speaking to Le Monde, Thierry said: "In a relatively short space of time, two and a half years, thanks to the mobilisation of members of parliament, NGOs, scientists and investigative journalists, a subject that was under the radar has made its way into the public debate, to the point where France now has one of the world's most ambitious laws on PFAS."
Thierry在接受《世界报》采访时表示："多亏议员、非政府组织、科学家以及调查记者的共同努力，在短短两年半的时间里，禁止PFAS使用这一议题已经进入公众讨论的热点话题，使法国如今拥有全球最严格的PFAS法规之一"。

Increased monitoring and pollution fines
加强监控与污染罚款机制

The bill that passed in the French National Assembly contained three parts that are designed to limit the French population to the damaging effects of PFAS exposure. The first, as mentioned above, is the ban on manufacture, import, export and marketing of certain materials or products that contain PFAS.
法国国民议会通过的这项法案包含三部分，旨在减少法国公众暴露于PFAS所带来的风险。第一， 如上所述，禁止制造、进口、出口和销售特定含有PFAS的材料和产品。

Second, the French government will need to plan for the mandatory control of PFAS in drinking water and to end the release of the chemicals into water by 2030. This measure goes beyond current EU legislation which requires water to be analysed for 20 PFAS chemicals. One chemical under particular scrutiny is the ultra-short chain trifluoroacetic acid (TFA), which has been found in large numbers in drinking water.
第二，法国政府必须制定计划，以强制监控饮用水中的PFAS含量，并在2030年前终止PFAS排入水体。这一措施超越了目前欧盟的法规（欧盟要求检测20种PFAS化学物质）。其中，一种备受关注的物质是超短链三氟乙酸（TFA），已发现其在饮用水中大量存在。

The results of the analyses must be communicated once a year, in an accessible format, for French citizens to access, in a bid to improve transparency over PFAS exposure.
分析结果必须每年以公众易懂的方式公布，以提高PFAS暴露的透明度。

The third aspect of the bill places the cost of removing PFAS from the environment on the manufacturer that creates the pollution. This 'polluters tax' will be set at €100 per 100 grams of discarded PFAS.
第三，污染治理费用将由造成污染的制造商承担。这项"污染者缴费"制度将按每100克废弃PFAS征收100欧元执行。

According to Nicolas Thierry, "This will represent about €10 million euros per year." The proceeds will be distributed to help upgrade water treatment systems in the municipalities in most need of funding.
据Nicolas Thierry称，"这大约每年可带来1000万欧元收入"。该资金将用于升级最需援助的市政供水系统处理设施。

Writing on its LinkedIn feed, French utility Veolia welcomed the law, stating: "This bill encourages us, collectively, manufacturers and environmental actors, to rethink our processes and to act even more upstream to prevent pollution."
法国公用事业公司威立雅（Veolia）在其LinkedIn页面上对这项法律表示支持："这项法案促使我们包括制造商和环保团体一同反思，从源头防止PFAS污染。"

Calls for EU-wide ban on PFAS
呼吁欧盟范围内全面禁止PFAS

There have been increasing calls for the European Union (EU) to take stronger action against PFAS pollution. EurEau, the European federation of national associations of water services has previously called on the EU to take greater action on tackling the problems posed by continued use of PFAS. The federation believes a ban is essential to prevent further contamination and to 'ensure the availability of safe, affordable water for all'.
越来越多的呼声要求欧盟对PFAS污染采取更有力的行动。欧洲水协会（EurEau）此前已呼吁欧盟加强对PFAS持续使用问题的应对。协会认为，禁止PFAS使用对防止进一步污染至关重要，也是"确保所有人都能获得安全、可负担的起水资源"之关键。

Sandra Bell, CHEM Trust's PFAS advisor, writing on the organisation's website, said: "This ban on PFAS in products like clothing and cosmetics is great news for French citizens worried about their exposure to these harmful chemicals. The not so good news is that some key products like cookware were exempted. Now France needs to get firmly behind an EU wide restriction on PFAS ensuring more products are included and citizens of all member states are protected".
环保组织CHEM Trust的PFAS顾问Sandra Bell在该机构网站上写道："法国对服装和化妆品等产品中PFAS的禁令，对担心这些有害化学物质的法国公民来说是个好消息。不太好的消息是，一些关键产品如炊具被豁免。现在法国需要坚定支持欧盟范围内对PFAS限制，使更多产品被纳入监管，确保所有欧盟成员国公民都受到保护。"

Now France needs to get firmly behind an EU wide restriction on PFAS
现在法国需要坚定地支持在欧盟范围内限制PFAS。

While any EU legislation would override French law, and include industrial as well as consumer manufacturing, there is unlikely to be a full ban in place until at least 2030.
虽然欧盟一旦立法将优先于法国国内法，并涵盖工业和消费品制造。但预计在2030年前欧盟不会出台全面禁令。

Talking to media about the need for further action, Hélène Duguy, legal expert of environmental charity ClientEarth, said: "This law has undeniable shortcomings. Nonetheless, France is one of the first countries to act on what is both a public health and an environmental crisis and it should be applauded."
环保法律组织ClientEarth法律专家Hélène Duguy在接受媒体采访时表示："这项法律确实存在不足之处。但法国是最早采取行动应对这一公共健康与环境危机的国家之一，这是值得肯定的"。

She added: "PFAS pollution has reached a critical point and common-sense restrictions are overdue. The weight of scientific evidence on the harms of PFAS is now overwhelming. Alternatives exist and it's imperative for top officials in Brussels and other countries to stop kicking the can down the road. We need sweeping restrictions on PFAS for consumer and industrial uses now."
她补充说："PFAS污染已达到临界点，对其限制早已迫在眉睫。关于PFAS危害的科学证据现在已经非常充分，其替代品业已存在。布鲁塞尔和其他国家官员必须立即对PFAS实施全面限制"。

Denmark's PFAS prevention and clean-up plan
丹麦对PFAS预防与清除计划

France joins Denmark in banning PFAS use in certain products — paper and cardboard food packaging, with a ban on the sale and import of consumer clothing, footwear, and waterproof materials from July 2026.
法国成为继丹麦之后第二个对特定产品实施PFAS禁令的欧洲国家。丹麦自2026年7月起将禁止销售和进口含有PFAS的食品包装纸板、消费类服装、鞋类及防水材料。

At the time of the ban, Denmark's environment minister, told media: "With this action plan, we take an important step forward in handling and reducing PFAS in our environment and daily lives. It is crucial for Danes to feel safe when putting rain gear on their children, drinking tap water, and eating homegrown potatoes. Therefore, three major efforts in the action plan involve banning PFAS in clothing and shoes, PFAS in soil, and drinking water. And Denmark will now take the lead in the EU by banning PFAS in clothing, shoes, and consumer impregnation products."
在禁令宣布时丹麦环境部长向媒体表示："通过此行动计划，我们在控制和减少环境与日常生活中的PFAS方面迈出了重要一步。丹麦人需要安心地为孩子穿上雨具、饮用自来水、食用自种土豆。因此，三项主要行动是禁止服装鞋类中的PFAS、管控土壤和饮用水中的PFAS。丹麦将带头推动欧盟出台禁令"。

Denmark is also implementing other measures, including:
丹麦还实施了其他措施，包括：

- Stronger monitoring of PFAS in water, food, and food-producing animals.
- 加强对水、食物及食品动物中的PFAS监测。

- Increasing public awareness.
- 提高公众认知。

- Funding water and soil clean up processes.
- 为水体和土壤清理工作提供资金。

- Advocating for an EU-wide ban.
- 倡导在欧盟范围内全面禁止PFAS。

AQUA TECHNOLOGY

SMART MANAGEMENT OF RESOURCES: EFFECTIVE INFRASTRUCTURE AND ASSET MONITORING
智慧资源管理：水务系统高效监控与维护

Water infrastructure relies on numerous assets that require monitoring and maintenance, from pipes and pumps to valves and treatment plants. Monitoring each of these assets presents its own challenges, but smart technologies are helping to create a better understanding of infrastructure health.
水务系统正常运行离不开对各类设备的监测、维护。不论是输水管网、加压泵站，还是调节阀门、水处理厂，每个环节都有不同的监控难点。如今智能技术推广应用有助于更好地掌握这些基础设施运行状况。

Aquatech Online talked to Swan members, Mattias Nahlin, chief strategy officer at Waltero, and Tom Bennett, commercial director at UDlive, to find how their companies are using technology to monitor and manage resources.
Aquatech Online 采访了 Swan 成员，包括 Waltero 首席战略官 Mattias Nahlin 和 UDlive 商业总监 Tom Bennett，以了解他们各自的公司如何利用技术来监控和管理所属资产。

Mattias Nahlin-Waltero
Waltero公司Mattias Nahlin讲解

Waltero uses computer vision and edge AI to solve a wide range of monitoring challenges in the water sector. Its W-Sensors capture and interpret images from wells, meters, pipes, pumps, and other infrastructure, making it possible to digitise many different assets with a single technology.

Waltero运用计算机视觉和边缘人工智能（Edge AI）技术，应对水行业监控中的诸多挑战。其W-Sensors产品能够捕获并分析自来水井、水表、管道、泵站以及其他基础设施的图像数据，使得通过单一技术手段实现多种资产数字化管理成为现实。

By processing data at the edge — directly on the device — Waltero's solution eliminates the need for constant cloud connectivity, which helps to reduce costs and improve efficiency. This means utilities can deploy a single, adaptable sensor across their network to track water usage, detect leaks, monitor equipment health, and even assess environmental conditions in real-time.
Waltero解决方案通过在边缘（即，设备本地）处理数据，消除了对持续云端连接的依赖，这有助于降低成本并提升效率。它表明，水务公司能够在他们的网络中部署一种统一且灵活的传感器，用于实时监测用水量、侦测泄漏、监控设备运行状况，甚至评估环境状况。

Why do companies in the water sector need to monitor assets and infrastructure?
水行业公司为什么需要监控资产和基础设施?

The infrastructure for delivering clean water and safely removing wastewater relies on a massive network of pipes, pumps, valves, and treatment plants. However, the quality and age of these assets varies both across and within countries.
提供清洁用水和安全处理废水的基础设施依赖于一个庞大的网络，包括管道、水泵、阀门以及处理厂。然而，这些关键资产的质量和使用年限在不同国家之间以及国家内部都存在着显著差异。

In Europe, for example, some pipes have been in use for more than a century. If something breaks unexpectedly – a burst pipe, a failing pump – it can cause serious service disruptions, environmental damage, and expensive emergency repairs.
以欧洲为例，部分管道已经使用了一个多世纪。如果这些管道意外破裂或泵站出现故障，可能会导致严重的服务中断、环境破坏以及昂贵的紧急维修费用。

"By monitoring their assets, companies can stay ahead of problems, catching leaks, pressure drops, or contamination risks before they turn into major issues," explains Nahlin. "But it's also about efficiency – knowing exactly when to maintain or replace equipment instead of running on guesswork saves money and extends the life of infrastructure."
"通过监控资产，企业可以预先发现问题，例如，管道泄漏、压力下降或污染风险，防止它们演变为重大事故"，Nahlin解释道，"但这同样关乎效率提升——确切掌握何时维护或更换设备，而不是仅依靠猜测，这样可以节省资金并延长基础设施的使用寿命。"

Ultimately, monitoring is about keeping water systems reliable, safe, and cost-effective while meeting strict regulations.
归根结底，监测是为了保证供水系统的可靠性、安全性和成本效益，同时满足严格的法规要求。

What challenges are associated with the traditional approach to monitoring?
传统监控方法面临哪些挑战?

Manual inspections are both expensive and inefficient. Nahlin added: "Not being able to keep track of operational visibility means problems go undetected until they get serious, and expensive to fix. With some utilities losing more than 20-30 per cent of the clean water as non-revenue-water to leaks and a growing water shortage in many parts of the world, this is obviously not sustainable."
人工核查不仅成本高昂，而且效率低下。Nahlin进一步指出："缺乏持续运行监控意味着问题在

演变成严重事故之前往往难以察觉，从而导致高昂的修复成本。因许多水务公司因管道泄漏而损失高达20~30%的清洁水资源，加之全球许多地区正面临日益严峻的水资源短缺问题，所以，这种做法显然是不可持续的。"

With aging infrastructure, worsening water scarcity, and more unpredictability driven by climate change, monitoring needs are increasing, and will only increase further.
随着基础设施老化、水资源短缺加剧以及气候变化带来的更多不可预测性，对监控的需求正在不断增长，并且预计未来只会进一步上升。

Nahlin added: "Therefore, there is a great push world-wide to fix the problem, the EU has set up large funds for digitisation and asset management, in particular, in the south of Europe. These efforts will be an important part of the solution to both save on operational costs and to fix the most critical problems."
Nahlin补充道："因此，全球范围内都在积极应对这一挑战。欧盟已经投入了大量资金用于数字化转型和资产管理，特别是在南欧地区。这些举措将成为解决这一问题的关键，既能降低运营成本，又能解决最紧迫的问题。"

How is smart technology helping to overcome those challenges?
智能技术如何帮助克服这些挑战?

One of the major advantages of using smart technology in asset monitoring and management is the ability to do so remotely, which cuts down on unnecessary, expensive site visits.
在资产监控和管理中，采用智能技术的一个核心优势在于实现远程操作，有效降低不必要的、成本高昂的现场堪察。

"Smart tech means you can go from firefighting mode to predictive maintenance, with near-real-time sensors, AI-powered analytics, and remote monitoring to catch issues early and optimize operations," Nahlin explained.
"智能技术意味着你可以从'救火模式'转变为预测性维护，通过近乎实时的传感器、人工智能驱动的分析和远程监控，及早发现问题并优化运营"。Nahlin解释道。

"For example, IoT sensors can track pressure, flow, and water quality 24/7, flagging anything unusual immediately. AI can analyse patterns and predict when a pump or pipe is likely to fail so maintenance teams can fix it before it breaks."
"例如，物联网（IoT）传感器可以24/7全天候不间断地监测压力、流量和水质，一旦发现异常情况便立即进行标记。人工智能（AI）可以分析数据并预测泵或管道可能发生故障的时间，以便维护团队在故障发生之前进行修复。"

Waltero's solutions focus on versatility, and ease of deployment. "Instead of expensive infrastructure overhauls, we provide a plug-and-play AI sensor system that can read existing meters and infrastructure with minimal setup."
Waltero的解决方案注重多功能性和易于部署性。"我们提供即插即用的人工智能传感器系统，可以读取现有仪表和基础设施信息，而无需昂贵的全面改造，设置极为简单"。

"Our Edge AI processing reduces the need for constant cloud connectivity, cutting down on power consumption and data costs." Nahlin explained. "This means the devices can run for up to a decade on the internal battery, and that implementation can be done quickly and without the complexity of traditional IoT deployments."
"我们的Edge AI技术减少了对持续云端连接的需求，降低了功耗和数据成本"。Nahlin解释道："这意味着设备可以依靠内部电池运行长达10年，并且可以快速实施，而无需传统物联网（IoT）部署的复杂性。"

What different technologies can be used, and how can water companies benefit from them?
可以使用哪些不同的技术，水务公司如何从中受益?

Smart technology is improving all the time. The market is full of different technologies and sensors - some of these are designed for very specific tasks and some solve multiple tasks. Often, different technologies will be combined to provide the required data sets, these include: IoT sensors, smart meters, advanced SCADA and cloud platforms, AI and machine learning and digital twins.
智能技术正持续发展，市场上涌现出众多技术与传感器。这些技术与传感器中，有的专为特定任务设计，而有的则能应对多种任务。通常，为了提供所需数据集，会将不同技术结合起来。这些技术包括物联网（IoT）传感器、智能仪表、先进的SCADA和云平台、人工智能（AI）、机器学习以及数字孪生。

Nahlin added: "By combining these technologies, you can reduce water loss, cut costs, improve regulatory compliance, and extend the life of your assets."
Nahlin补充道："通过这些技术结合，可以减少水资源损失，降低成本，提高合规性，并延长资产的使用寿命。"

Waltero uses a variety of smart technologies to monitor assets and infrastructure:
Waltero使用多种智能技术来监控资产和基础设施：

• Edge AI and computer vision: Sensors use on-device intelligence to read water meters, detect anomalies, and process data locally. This reduces power consumption and enables faster, real-time insights.
• 边缘人工智能（Edge AI）和计算机视觉：传感器利用设备端智能读取水表、检测异常并在本地处理数据。这一过程不仅减少了能耗，还实现了更为迅速的实时监控。

• IoT and wireless connectivity: Solutions use LTE-M, NB-IoT, and WiFi to transmit data reliably, even in areas with connectivity challenges.
• 物联网（IoT）和无线连接：使用LTE-M、NB-IoT和WiFi可靠地传输数据，即使在连联网困难的区域也能正常工作。

• Ultra-low power, battery-powered, low-maintenance sensors: Designed for long-term use, sensors operate efficiently without frequent battery replacements.
• 超低功耗、电池供电、低维护传感器：设计用于长期使用，传感器无需频繁更换电池即可高效运行。

• Cloud AI: For alarms, anomaly detection, data refinement, system-wide insights and prioritisation.
• 云端人工智能（Cloud AI）：用于警报、异常检测、数据精炼、系统范围观察和优先级排序。

• Cloud and API integration: Data is easily accessible through the Waltero platform or via APIs, making it seamless for utilities to integrate into existing systems.
• 云端和API集成：数据可以通过Waltero平台或API轻松访问，使水务公司能够无缝集成到现有系统中。

Nahlin told Aquatech Online: "This combination allows Waltero to digitise water networks faster, more efficiently, and with lower deployment costs

than traditional smart metering solutions."
Nahlin向Aquatech Online表示："这种组合使得Waltero能够以比传统智能计量解决方案更快、更高效方式实现水网络数字化，并且部署成本更低。"

VA Syd, the biggest water utility in the south of Sweden, is using Waltero W-Sensors to monitor the inlets to their water production, to perform predictive maintenance and avoid blockages. Using Waltero's camera sensors, the utility has already been able to cut operational costs by almost 70 per cent, while simultaneously improving the quality of its work.
瑞典南部最大的水务公司VA Syd正在使用Waltero的W-Sensors监控其水处理设施的进水口，以进行预测性维护并避免堵塞。通过使用Waltero摄像头传感器，该公司已经能够将运营成本降低近70%，同时提高了工作质量。

What is the future of smart monitoring?
智能监控的未来是什么？

The water sector is set on a path towards fully digital, AI-powered networks, where every asset is continuously monitored and optimised. However, some countries are further advanced than others. With water supplies diminishing and infrastructure ageing, the future of water supply will rely on:
水务部门正朝着完全数字化、人工智能驱动的网络迈进，其中，每一项资产都将被持续监控和优化。然而，不同国家在这一进程中的进展存在差异。随着水资源供应减少和基础设施老化，未来水供应将依赖于：

- AI-driven predictive maintenance, where utilities fix issues before they become major failures.
- 人工智能驱动的预测性维护，使公用事业部门能够在问题演变成重大事故之前及时进行修复。
- Seamless connectivity, with IoT and satellite solutions making real-time monitoring possible everywhere.
- 无缝连接，通过物联网和卫星解决方案实现无处不在的实时监控。
- More autonomy, as AI-powered devices make decisions at the edge, reducing the need for human intervention.
- 更高自主性，由人工智能驱动的设备在边缘做出决策，减少对人工干预的需求。
- Integrated digital twins, where entire water networks are mapped digitally to simulate and optimize performance.
- 集成数字孪生技术，整个水网络被数字化映射，以模拟和优化性能。

Nahlin concluded: "As the industry moves forward, those who embrace smart, adaptable solutions will not only save money and resources — they'll also play a key role in ensuring sustainable water management for generations to come."
Nahlin总结道："随着行业向前发展，那些采用智能、适应性解决方案的企业不仅将节省资金和资源——他们还将在确保后代可持续水资源管理方面发挥关键作用。"

TOM BENNET, UDLive
UDLive 公司Tom Bennet阐述

UDlive provides end to end analysis solutions, both hardware and software for the water sector, including utilities, insure-tech, facilities management, and flood preparedness. The hardware features sensors that takes measurements remotely with sub-millimetre accuracy and uploads these onto the cloud, while the software features data presentation and analytic tools that drive insights from the data.
UDlive为水务行业提供了端到端分析解决方案，整合了硬件与软件，服务范围覆盖公用事业、保险科技、设施管理以及防洪预防等多个领域。其硬件产品以高精度传感器为核心，能够实现亚毫米级别的远程测量，并将收集的数据上传至云端；软件方面，则配备了强大的数据展示和分析工具，旨在从海量数据中提炼出有价值的信息。

The company was founded in 2018 and has since grown to work with the majority of UK water companies, a number of local authorities, and critical infrastructure organisations such as energy or transport companies. It is has now expanded to Europe and North America.
该公司成立于2018年，自那时起已与大多数英国水务公司、一些地方政府以及能源或运输公司等关键基础设施组织建立了合作关系。目前，其业务已扩展至欧洲和北美。

Why do companies need to monitor assets and infrastructure?
为什么公司需要监控资产和基础设施？

Our relationship with water is one of having too little or too much. Water is a precious resource and scarcity is a real issue around the world. On the other hand, too much water, and the wrong type of water, can cause enormous problems, whether that's flooding, sewage spills, overflows and backups.
我们与水资源的关系是水资源匮乏或者过剩。水是一种宝贵的资源，然而，水资源短缺已经成为全球面临的现实挑战。另一方面，过多的水或不当类型的水（如洪水、污水泄漏、溢流和倒灌）可能引发巨大的问题。

"Too much water can cause enormous amounts of distress and can be incredibly costly," Tom Bennett, UDlive's commercial director, told Aquatech Online.
"过多的水可能造成巨大破坏，并带来极其昂贵的代价"。UDlive商业总监Tom Bennett向Aquatech Online表示。

"Having the right amount of water in the right place at the right time is one of the fundamentals of life for everyone. And in order to achieve that you've got to have a strong understanding of your assets, how they're operating, what the problems are, what the capacity is, where the lack of capacity is, etc."
"在恰当的时间和地点拥有充足的水资源是每个人生活基本需求之一。为了实现这一点，你必须深入了解你的资产，包括它们的运行状况、存在的问题、现有的容量以及容量不足之处等"。

What challenges are associated with the traditional approach to monitoring?
与传统监控方法相关的挑战有哪些？

To understand your network, its assets and infrastructure, it is not enough to simply have smart technology. You need to know where

to monitor, how your monitoring technology works together, you need quality components and you need to be able to communicate reliable data consistently, in order to be able to drive usable insights.
要全面了解你的网络、资产和基础设施，仅仅依赖智能技术是不足够的。你需要明确监控的关键点，确保你的监控技术能够高效协同，同时，你需要高质量的组件，并且能够持续稳定地传递可靠数据，以便能够得出有价值的信息。

"You need to scale the monitoring to cover the network, but that mustn't be at the expense of data quality." Bennett explained. "If you don't have quality data being recorded, then the whole thing is going to fall down. Rubbish in, rubbish out, as they say."
"你需要扩大监控范围，以覆盖整个网络，但这绝不能以牺牲数据质量为代价"。Bennett解释道，"如果你没有记录到高质量的数据，那么整个系统就会崩溃。正如常人所说，垃圾进，垃圾出"。

What different technologies can be used, and how can water companies benefit from them?
可以使用哪些不同的技术，水务公司如何从中受益？

UDLive uses radar technology for level and flow measurement in sewer systems, which provide much greater accuracy and reliability than ultrasound and float switches.
UDLive运用雷达技术对下水道系统内水位和流量进行精确测量，其准确性和稳定性显著超越了超声波和浮子开关。

"Float switches don't provide you with very granular detail and they also get snagged the whole time, ultrasound often doesn't cope well with humid conditions and isn't able to provide you with constant level data," Bennett told Aquatech Online.
"浮子开关无法提供精细的细节，并且它们常常会出现卡滞。而超声波技术在潮湿环境下表现不佳，同样无法提供连续的水位数据"。Bennett向Aquatech Online表示。

Ultrasound also struggles with 'benching', i.e. where measurements of the height of water in the sewer is affected by obstacles such as steps and other structures, even cobwebs. "This is why we have transitioned away from constant level monitoring to using radar, as they provide more accurate data."
超声波技术在面对"台阶效应"时显得力不从心，这是因为下水道中水位测量会受到台阶、其他结构乃至蜘蛛网等障碍物干扰。因此，"我们决定从持续水位监测转向采用雷达技术，因为雷达能够提供更为精确的数据"。

Reliable communications are key to remote smart monitoring, otherwise the devices will need site visits, which becomes expensive.
可靠的通信是远程智能监控的关键，否则设备将需要实地考察，这会导致成本大幅增加。

"We've achieved this using new cellular technologies that provide greater availability and help reduce power consumption, such as CAT-1(bis), which is part of the 4G band this has helped bring down power consumption. But it also means you can deploy a device for five to seven years before returning to it, which helps the business case, as you don't need to close roads and deploy teams of workers, and the cost of all that, especially when you have tens of thousands of remote monitoring sensors on your network."
"我们借助先进的蜂窝技术达成了这一目标，这些技术不仅提升了系统的可用性，还有助于减少能耗。例如，CAT-1(bis)技术，作为4G频段的一部分，有效降低了能耗。这也意味着设备部署后，在长达5~7年时间内无需进行维护，从而增强了商业的可持续性。因为无需封闭道路，也不必派遣大量工人，这些措施会大幅增加成本，特别是在网络中部署了成千上万的远程监测传感器时，成本的增加尤为显著。"

When working with sewers, it is also important to use sensors that are built for the harsh environment. They need to be able to withstand corrosion, the right type of antennas that ensure reliable communication, and also the right type of radar technology.
在处理下水道时，使用能适应恶劣环境的传感器也很重要。这些传感器需要能够抵抗腐蚀，配备确保可靠通信的合适类型天线，以及适合的雷达技术。

What different technologies can be used, and how can water companies benefit from them?
可以使用哪些不同的技术，水务公司如何从中受益？

UDLive's most popular product is the Pixel2, which is an integrated radar sensor with a data logger remote telemetry unit (RTU). The all-in-one compact device has been designed to be easy to deploy in a wide range of settings such as in manhole covers and above water courses.
UDLive最受欢迎的产品是Pixel2，这是一款集成了雷达传感器和数据记录器远程遥测单元（RTU）的设备。这款一体化紧凑型设备设计能在各种环境中轻松部署，例如，在井盖内和水道上方位置。

"We've tried to be flexible with needs, so the telemetry unit can plug into a wide variety of different sensors and instrumentation, and can work with different protocols to transmit data, depending on what you want to measure. You can also deploy the sensor remotely from the telemetry unit, e.g. in deep sewers where the RTU needs to be closer to the surface. Other sensors can be deployed in rivers to measure water levels more accurately than pressure-based sensors."
"我们尽力满足不同的需求，因此，遥测单元可以接入多种不同的传感器和仪器，并且可以根据需要测量的内容，使用不同的协议传输数据。您还可以将传感器与遥测单元分开部署，例如，在深井中，RTU需要靠近地表放置，其他传感器可以部署在河流中，比基于压力的传感器更准确地测量水位"。

The data can be pulled together and analysed in UDLive's own portal or can be used by customers in their own systems.
数据可以在UDLive自己的门户中汇总和分析，也可以由客户在其自己的系统中使用。

In total, UDLive has over 30,000 devices deployed across sewer networks, rivers, other water courses and reservoirs. One such deployment was with Northern Ireland Water which was experiencing high levels of water entering a treatment centre. The utility had plans to build new infrastructure with the cost entering millions of pounds. UDlive used flood modelling software to identify the best places to deploy a sensor network. In one example, the sensors then identified that there was a large amount of water infiltrating the sewer network from an adjacent water course.
UDLive已在污水管网、河流、其他水道以及水库中部署了超过30,000台设备。其中，一个案例是与北爱尔兰水务公司合作，该公司当时面临大量水进入处理中心的问题。该公司原本计划建造新的基础设施，成本高达数

百万英镑。UDLive使用洪水建模软件确定了部署传感器网络的最佳位置。在一个实例中，传感器揭示了大量水从邻近水道渗入污水管网的情况。

"So, we could say to the utility, by all means investigate but basically if you were to reline this section of the network you would significantly reduce the amount of water entering the treatment centre. Then there would be no need to for additional expensive infrastructure."
"因此，我们可以向公用事业公司明确表示，尽管需要进行调查，但本质上，如果对这部分管网进行重新铺设，将显著降低流入处理中心的水量。这样，便无需额外投资建设昂贵的基础设施了"。

Smart technology, deployed correctly, to provide quality, reliable, consistent data meant an outlay of tens of thousands, rather than millions. A huge cost saving.
正确运用的智能技术能够提供高质量、稳定且一致的数据，这表明仅需投入数万而非数百万的资金。这是一项显著的成本节约。

Another project with the Milan water company in Italy also identified infiltration that was leading to high volumes of water entering a treatment plant, however, in this instance, the sensors also identified blockages in the sewer system that would need expensive remediation and so the insights gained from the sensor data was that, in this case, the excess water was best left in the network to help flush out those blockages.
与意大利米兰自来水公司合作的另一个项目中，同样发现了导致大量水进入处理厂的渗漏问题。然而，在这个案例中，传感器还识别出了污水系统中的堵塞问题，这些问题需要昂贵的修复措施。因此，从传感器数据中得出的启示是，在这种情况下，让多余的水留在管网中，以帮助冲刷这些堵塞物，这可能是更为明智的选择。

This ability to predict blockages has also been used in a project with Anglian Water in the UK. UDLive is helping the utility predict blockages so that they can be cleaned before they lead to sewer overflow.
这种预测堵塞的能力也在英国Anglian Water的一个项目中得到了应用。UDLive正在帮助该公用事业公司预测堵塞，以便在它们导致污水溢出之前进行及时清理。

What is the future of smart monitoring?
智能监测的未来是什么?

The future of smart monitoring goes beyond water sector assets and infrastructure, according to Bennett.
Bennett认为，智能监测的未来将超越水务行业的资产和基础设施。

"We've got to join different stakeholders together to get a broader picture because it's great that as sector we've gone from treatment works and pump stations to broader network monitoring, but actually the full network is broader still. You need to be looking at the hills, the fields, the roads, the impact of paving over gardens, these sort of things, because water is not spread evenly throughout the year, and with changing climactic patterns. You've got to look at sustainable urban drainage suds and ways of holding that water up so it doesn't all enter the network in 20 minutes, but is spread out at least over 12, 24, 48 hours."
"我们必须联合各利益相关方，以获得更全面的视角。毕竟，作为一个行业，我们的关注点已经从处理厂和泵站扩展到更广泛的网络监测。这无疑是个进步，但实际上，网络的完整范围还要更广。你需要关注山丘、田野、道路、花园铺路等环境因素的影响，因为水资源并非全年均匀分布，且气候模式也在持续变化，必须考虑可持续的城市排水系统（SUDS）以及蓄水策略，确保水不会在短短20分钟内全部涌入管网，而是能够在12、24、48小时内分散排放。"

Bennett believes the solution is to view the broader network — rivers, fields, roads, sewers, pump stations, treatment plants — in terms of catchment areas, which would involve greater information and data sharing. Understanding when to monitor, or how frequently, will also be important, with intelligent solutions gaining an almost 'live' picture of the catchment but only providing insights and data in response to changing weather patterns and water levels.
Bennett认为，解决方案是从集水区角度看待更广泛的网络——河流、田野、道路、下水道、泵站、处理厂——这将涉及更多的信息和数据共享。了解何时监测或监测频率也将非常重要，智能解决方案将获得集水区近乎"实时"的图像，但这仅是根据变化的天气模式和水位提供的信息和数据。

"Weather forecasts and geological data feeding into the live sensor readings that will drive a much greater accuracy of model, an all-encompassing vision of a catchment area. I think that's going to be crucial. This will lead to better flood preparedness, wastewater and storm management and ultimately how to use water more effectively."
"将天气预报和地质数据整合进实时传感器读数中，这将显著提升模型的精确度，并为我们提供一个全面的集水区影像。我认为这一步骤至关重要。它将促进更佳的防洪预备、更有效的污水和暴雨管理，最终实现水资源的更高效利用。"

AQUA
TECHNOLOGY

02

Technical Reports
技术报道

聚焦全球水处理技术前沿，整合绿色低碳工艺、AI驱动的智能水务、资源回用突破等创新实践，揭示技术驱动的产业变革路径。

MEMBRANE SCALE-UP SECURES FACTORY INVESTMENT
REDSTACK电膜堆技术引领水处理

REDStack, a Dutch membrane scale-up, has secured significant investment that will accelerate the commercialisation of its ElectroMembrane Stack technology. The funding will be used to create a fully automated production line at its base in Heerenveen, ramping up output from one stack a week to 10 and the potential to reach 1,000 per year, per shift.
荷兰膜技术领域的规模化企业 REDStack 获得了重要投资，将加快其电膜堆技术的商业化进程。此次资金将用于在其 Heerenveen 基地上建设一条全自动生产线，产能将从每周一个堆栈提升至 10 个堆栈，且每班次年产量有望达到 1000 个堆栈。

Investment round led by PureTerra Ventures
投资轮由PureTerra Ventures领投

The investment round was led by Amsterdam-based water tech investor PureTerra Ventures, with additional input from NV NOM and Easter Technologie. The level of investment was undislosed.
此次融资由总部位于阿姆斯特丹的水技术投资机构PureTerra Ventures领投，NV NOM和Easter Technologie也参与了投资，但具体投资金额尚未公开。

Paula Gonzalez, REDstack CEO, told media: "This investment is more than just upscaling technology ¬¬— it's about harnessing the power of disruptive technology to address water treatment, climate change, and resource scarcity. REDstack exemplifies the potential when technology and purpose unite."

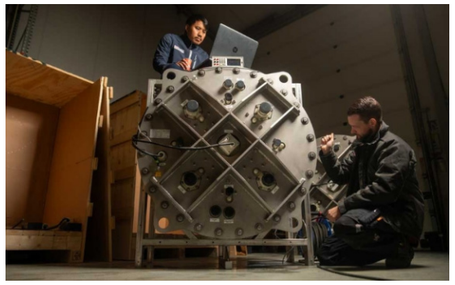
REDStack首席执行官Paula Gonzalez对媒体表示："这笔投资不仅仅是技术的规模化升级，更是利用颠覆性技术应对水处理、气候变化和资源短缺的力量体现。REDStack展示了技术与使命相结合的巨大潜力。"

Nic Pannekeet, partner at PureTerra Ventures, told media: "Since the original electrodialysis reversal (EDR) stack was designed some 50 years ago the industry has been waiting for a breakthrough in electrodialysis technology. Enter REDstack with its innovative design, extreme

reduction of energy consumption, extension of membrane lifetime, reduced maintenance, and 100 per cent leak-free operation. We are very excited to bring this leap forward from traditional EDR technology to the global market.
PureTerra Ventures合伙人Nic Pannekeet对媒体说："自约50年前最初的电渗析倒极（EDR）堆栈设计问世以来，整个行业一直在等待电渗析技术的重大突破。REDstack凭借其创新设计应运而生——不仅大幅降低能耗、延长膜寿命、减少维护需求，更实现了100%无泄漏运行。我们非常兴奋能将这项突破传统EDR技术的飞跃性成果推向全球市场。"

He added: "Our investment will contribute to an automated production line, fuelling the commercialization and global impact of this game-changing technology."
他补充道："我们的投资将助力建设自动化生产线，加速这一颠覆性技术的商业化进程，并扩大其全球影响范围。"

REDStack membrane technology
REDStack膜技术介绍



Founded in 2005, REDstack's technology was originally developed at Wetsus. The latest investment will enable the company to accelerate the commercialisation and large-scale production of its ElectroMembrane Stack technology.
REDstack成立于2005年，其技术最初由荷兰水技术研究所Wetsus孵化。此次最新投资将助力公司加速电膜堆技术的商业化及大规模生产。

Originally developed in the 1960s, EDR stack technology is used commercially to treat brackish water from both ground and industrial sources. The technology uses electrodialysis to remove salts.
电渗析倒极（EDR）堆栈技术起源于1960年代，现主要用于地下水和工业废水的苦咸水处理，通过电渗析工艺实现脱盐。

REDStack's ElectroMembrane Stack technology takes the process a step further by combining Anionic Exchange membranes (AEM), Cationic Exchange membranes (CEM), and Bipolar Membranes in its stacks to not only remove salts from the water, but also to recover nitrogen (from acidic scrubbers) and carbon dioxide (from alkaline solutions in Direct Air/Ocean Capture).
REDStack的电膜堆技术通过创新集成阴离子交换膜（AEM）、阳离子交换膜（CEM）及双极膜，将脱盐工艺推向新高度——不仅能高效去除水中盐分，还可从酸性洗涤器回收氮元素，并通过直接空气/海洋捕集技术中的碱性溶液回收二氧化碳。

Sjouke Mulder, NOM, told media: "At NOM, we are committed to empowering innovative companies that drive impactful transitions in sustainable and smart technologies. REDStack's advancements in water technology align perfectly with our mission."
NOM公司代表Sjouke Mulder向媒体表示："NOM始终致力于赋能那些推动可持续与智能技术领域重大变革的创新企业。REDstack在水技术领域的突破性进展，与我们的战略使命完美契合。"

He added: "Their recent establishment in Heerenveen and strong connection to Wetsus in Leeuwarden underline the importance of collaboration in fostering sustainable growth in the Northern Netherlands. By investing in REDStack, we are enabling innovation that addresses global water challenges while strengthening the regional economy."
他补充道："REDstack近期落户Heerenveen，并与Leeuwarden Wetsus保持紧密合作，彰显了协作对荷兰北部可持续增长的重要性。此次投资不仅助力应对全球水资源挑战的技术创新，也将为区域经济注入活力。"

Optimising flow to reduce energy costs
优化流态以降低能源成本

REDStack's EDR stack technology is helping to address a number of key priorities for water treatment: reducing energy costs; and both carbon and nitrogen capture.
REDStack的EDR堆栈技术正在攻克水处理领域的多个关键优先事项：降低能源成本，以及碳和氮的捕集。

The stacks are able to use membranes and spacers from a variety of suppliers. They are designed using patented technology and employ 100 per cent liquid-tight, fully closed modules with 'perfect flow' distribution to avoid 'carry over' of liquids between compartments.
该堆栈能够使用来自多家供应商的膜和隔片。其专利技术打造的100%液体密封全封闭模块，通过"完美流态分布"设计，从根本上杜绝了传统电渗析系统中常见的腔室间液体串流问题。

The optimisation of this flow distribution has the effect of reducing the energy required for ion transport, to a level the company states is two or three times less than comparable systems.
通过流态分布优化设计，该系统将离子迁移所需能耗降至新低，公司称这比同类系统节能达到两到三倍。

Current use and future plans
当前应用与未来规划

REDStack's ElectroMembrane Stack technology is already being proved in real-world environments, including on the Afsluitdijk dam in Netherlands for energy generation and CO2 capture, as well as for treating recycling paper mill effluent at IndustrieWater Eerbeek, also in the Netherlands.
REDStack的电膜堆技术已在实际环境中得到验证，包括荷兰Afsluitdijk大坝的能源发电与二氧化碳捕集项目，以及荷兰IndustrieWater Eerbeek造纸厂废水处理项目。

Pieter Hack, founder of REDstack and representative of W&F Technologies B.V., welcomed the investment and what it would mean for the company's future: "As founder of REDstack, I am happy and proud that with this new investment from leading and renowned investors, REDstack is heading to its next phase in becoming the leading supplier of technology and electromembrane stacks for innovative and sustainable applications in the water market."
REDStack创始人及W&F Technologies B.V.代表Pieter Hack对此次投资给予高度评价："作为REDstack创始人，我怀着欣喜与自豪的心情宣布——凭借顶级投资机构的战略注资，公司将迈入新发展阶段，致力于成为水处理市场创新可持续应用领域的技术与电膜堆核心供应商。"

TOSHIBA PILOTS BATCH WATER PURIFICATION SYSTEM
批量水处理技术：东芝携手SALINITY SOLUTIONS共建可持续未来

Japanese water and wastewater treatment company Toshiba Infrastructure Systems & Solutions Corporation (TISS) is diversifying its portfolio and will offer the highly energy-efficient batch purification technology provided by UK-based Salinity Solutions.
日本水及污水处理公司——东芝基础设施系统与解决方案公司（TISS）正拓展其业务领域，将引进英国Salinity Solutions 公司提供的高能效批量净化技术。

Successful trial for world-first technology
全球首创技术试验成功

TISS placed an order for the Salinity Solutions' HyBatch system following the conclusion of a lab-based feasibility trial. HyBatch's patented batch processing system is the first to be manufactured commercially. It was developed to reduce the environmental impact of water treatment, which matches TISS' commitment to contribute to the achievement of Sustainable Development Goals (SDGs), and to reduce environmental impacts with consideration for the circular economy and the welfare of ecosystems.
在完成实验室可行性试验后，TISS订购了Salinity Solutions的HyBatch系统。HyBatch的专利批量处理系统是首个实现商业化生产的系统。它旨在减少水处理对环境的影响，符合TISS致力于推动可持续发展目标（SDGs）实现、在考虑循环经济和生态系统福祉的情况下减少环境影响的承诺。

Steve Dunn, commercial and operations director, Salinity Solutions, told Aquatech Online: "We're delighted to be given this opportunity. We know our technology has the potential to benefit a range of sectors with its many applications and we look forward to showing its capabilities."
Salinity Solutions商业及运营总监Steve Dunn在接受Aquatech Online采访时表示："我们很高兴获得这次机会。我们相信我们的技术具有多种应用潜力，能够惠及多个行业，我们期待展示它的能力。"

The need for energy-efficient water solutions
对节能水处理解决方案的需求

Salinity Solutions was established with the goal of addressing the two biggest challenges in sustaining human life on earth – water and energy. Water stress is a problem facing the entire world and all forecasts suggest it will only get worse. At the same time, water demand is set to double over the next five years, which provides an opportunity for technology and water reuse to meet demand while addressing shortage.
Salinity Solutions公司成立的目标是解决地球人类生命的两大挑战——水和能源。水资源紧张是全球性问题，所有预测都表明它只会恶化。同时，未来五年全球用水需求预计将翻倍，这为技术和水资源再利用提供了满足需求、缓解短缺的机会。

However, estimates suggest 80 per cent of the word's wastewater is returned to rivers, oceans, and other water sources without being treated. Treating more water is both a solution and a major challenge, especially as the water that does currently get treated uses approximately four per cent of the world' total electricity production. Treating more water using conventional technology will consume huge amounts of energy.
然而，据估算，全球约80%的废水未经处理便直接排入河流、海洋等水体。增加废水处理既是解决方案，也是重大挑战，尤其是在目前处理水大约可以消耗全球总电力产量的4%的情况下，这就使得使用传统技术处理更多水将会消耗大量能源。

In response to this challenge, Salinity Solutions, a spin-out from The University of Birmingham, developed its batch purification technology, which uses half the energy of traditional methods.
针对这一挑战，来自伯明翰大学（University of Birmingham）的衍生企业Salinity Solutions公司开发了其批量净化技术，其能耗是传统方法的一半。

Its patented, commercially viable solution has been described as the biggest step forward in water treatment in 50 years and has the potential to benefit membrane processes in every corner of the globe — from industrial wastewater clean-up and high value mineral extraction to rural drinking water.
这项拥有专利的、具备商业可行性的解决方案被称为50年来水处理领域的最大进步，有潜力惠及全球各地的膜处理工艺——从工业废水净化、高价值矿物回收到农村饮用水供应。

Toshiba's commitment to water and the environment
东芝对水与环境的承诺

TISS is part of Japan's Toshiba Group. It provides products and services with the goal of solving common global issues, such as those involving water and the environment.
TISS是日本东芝集团的一部分，致力于通过产品和服务解决全球共同面临的问题，如水资源和环境保护问题。

In the water space, TISS provides water and wastewater treatment systems and 'operational know-how to solve customer issues all over the world and contributes to the creation of environmentally advanced communities with sustainable water infrastructure in response to regional, cultural, and environmental requirements'.
在水处理领域，TISS提供水和废水处理系统以及"运营技术知识，解决全球客户的难题，响应区域、文化和环境需求，助力建设具有可持续水基础设施的环境先进社区"。

It has been involved in water infrastructure since the 1970s, and offers everything from business planning to operation management, working across the life cycle of a water treatment plant.
自1970年代以来，公司一直参与水基础设施建设，提供从业务规划到运营管理的涵盖水处理厂全生命周期的服务。

How the technology works
技术原理介绍

A company spokesperson told Aquatech Online: Salinity Solutions' HyBatch is the world's first commercialised batch reverse osmosis wastewater treatment technology. It purifies up to 98 percent of wastewater with 50 per cent less energy than conventional systems and is also easily transportable."
公司发言人在接受Aquatech Online采访时表示："Salinity Solutions的HyBatch是世界首个商业化应用的批量反渗透废水处理技术。它能够以比传统系统减少50%能耗的方式净化高达98%的废水，而且便于运输。"

They added: "It works by using varying amounts of pressure to push water through a membrane to give optimal results."
他们补充道："该技术通过施加不同程度的压力，将水推动通过膜，以实现最佳净化效果。"

Unlike conventional reverse osmosis membrane systems, the company's proprietary system can achieve a higher recovery within a smaller footprint by recirculating feedwater around the membrane.
与传统反渗透膜系统不同，该公司的专利系统通过在膜周围循环进水，实现了更高的回收率，同时占地面积更小。

Its patented pressure exchange process dramatically reduces the average pressure in the system and therefore the energy consumption. This allows it to purify a higher amount of wastewater, generate less waste, and be more compact than traditional systems.
其专利的压力交换工艺显著降低了系统内的平均压力，从而减少了能耗。这使系统能够净化更多废水、产生更少废物，并比传统系统更紧凑。

Since launching in 2021, Salinity Solutions has completed successful trials and pilots in multiple industries, including lithium mining, industrial and municipal wastewater, agriculture, and food production, including trials with SUEZ. The company has also built a strong sales pipeline across multiple sectors and geographies. Salinity Solutions' technology is currently in use in the UK and Germany and will soon be operating in France and Chile.
自2021年推出以来，Salinity Solutions已在锂矿开采、工业及市政废水、农业和食品生产等多个行业完成了成功的试验和示范，包括与苏伊士（SUEZ）的试验。该公司还在多个行业和地区建立了强大的销售渠道。Salinity Solutions的技术现已在英国和德国投入使用，且即将在法国和智利运营。

REAL-TIME NITROUS OXIDE MONITORING IN SEWAGE TREATMENT PLANTS
污水处理厂实时监测一氧化二氮排放

Dutch water research institute KWR is extending its real-world monitoring of nitrous oxide emissions from wastewater treatment plants at a second site in the Netherlands.
荷兰水研究机构 KWR 正在荷兰的第二个站点扩展其对污水处理厂一氧化二氮（N_2O）排放的实时监测。

A project to monitor and model nitrous oxide emissions
一氧化二氮排放监测与建模项目

KWR has been carrying out a monitoring operation at WWTP Utrecht (Hoogheemraadschap De Stichtse Rijnlanden) since 2023 as part of the Monitoring, modelling and reduction of nitrous oxide emissions from WWTPs project.
自2023年起，KWR作为"污水处理厂N_2O排放监测、建模与减排项目"的参与方，一直在乌特勒支污水处理厂（Hoogheemraadschap De Stichtse Rijnlanden）开展监测工作。

The project is being run with a group of partners: Emerson Process Management B.V., Douna Machinery B.V., De Stichtse Rijnladen Water Board, Drents Overijsselse Delta Water Board, Noorderzijlvest Water Board, and Delfland Water Board.
该项目由多方联合推进，合作伙伴包括：艾默生过程管理公司（Emerson Process Management B.V.）、Douna机械设备公司（Douna Machinery B.V.），以及De Stichtse Rijnlanden、Drents Overijsselse Delta、Noorderzijlvest和Delfland四家地区水务局。

Now, the original plant has been joined by a second wastewater treatment plant: Nieuwe Waterweg (Hoek van Holland, Hoogheemraadschap van Delfland). Both plants will be tracking nitrous oxide emissions but using different process configurations.
目前，位于荷兰角港（Hoek van Holland）的Nieuwe Waterweg污水处理厂（隶属于Delfland水务局）已加入监测网络，成为第二个试点站点。

两座污水处理厂将采用不同的工艺配置同步追踪N_2O的排放。

Findings from the project will add to a wider body of research that looks to address the problems associated with nitrous oxide release, including the Net Zero Partnership Study coordinated by Aarhus Vand.
项目数据将纳入更广泛的N_2O排放治理研究体系，其中包括由丹麦奥胡斯水务公司（Aarhus Vand）主导的"净零伙伴关系研究计划"。这些成果有望为全球污水处理行业提供基于实证的减排路径。

Why is nitrous oxide such a problem for wastewater treatment
污水处理为何受困于N_2O排放?

Nitrous oxide is a greenhouse gas that has a global warming potential (GWP) that is almost 300 times greater than carbon dioxide, according to a study published in the journal Nature. And while the level of emissions in the atmosphere are lower than carbon dioxide, the study (published in 2020) suggested that nitrous oxide emissions were on a path to cause 'a global temperature increase above three degrees by the end of this century'.
《自然》杂志2020年刊发的一项研究表明，N_2O作为温室气体，其全球变暖潜能值（GWP）几乎是二氧化碳的300倍。尽管当前大气中N_2O的排放水平低于CO_2，但该研究警告称，若以目前排放趋势持续，N_2O的排放将导致"到本世纪末全球气温上升3℃以上"。

While sewage treatment plants do not produce as many nitrous oxide emissions as, for example, agricultural fertiliser, they are still a significant source of emissions.A whitepaper, produced by Royal HaskoningDHV, entitled 'Reducing nitrous oxide emissions at wastewater treatment plants' looked into these issues in further detail.
尽管污水处理厂中的N_2O排放量低于农业化肥施用等N_2O主要来源，但仍不容忽视。荷兰皇家HaskoningDHV工程咨询公司发布的行业白皮书《污水处理厂N_2O减排路径》对这些问题进行了更详细的研究。

Speaking to Aquatech Online in 2023, Xylem's Innovation Labs Accelerator Programme lead, Dr Oliver Puckering, said at the time: "Efficient monitoring of nitrous oxide emissions is a vital concern for wastewater utilities in their pursuit of comprehensive carbon inventories and meaningful mitigation targets. The 2019 Intergovernmental Panel on Climate Change (IPCC) guidelines introduced a tiered approach for nitrous oxide emissions estimation. However, these guidelines often underestimate actual emissions, leading to precision limitations in mitigation planning."
赛莱默（Xylem）创新实验室加速器项目负责人Oliver Puckering博士在2023年接受Aquatech Online专访时指出："构建高效的N_2O监测体系，是水务机构实现全口径碳清单核算与科学减排目标的核心前提。2019年，气候变化政府间专门委员会（IPCC）的指导方针提出了一种分层排放估算法，但其预设的排放因子低估了实际排放量，导致减排规划出现系统性偏差。"

He spoke further on the challenges of measuring nitrous oxide, stating that "emissions are far from constant; they exhibit considerable variability and dynamic seasonal patterns influenced by factors like temperature, nitrogen loads and aeration demand patterns in treatment plants."
Puckering进一步指出监测技术的核心难点："N_2O排放量远非恒定并呈现高度动态特征，其波动受温度、进水氮负荷、曝气模式等多重因素驱动，且存在显著的季节性规律。"

What does the project involve?
该项目包含哪些内容?

The project is measuring real-time and continuous nitrous oxide emissions in the gaseous phase, capturing both daily and seasonal variations, and it is these variations that conventional modelling techniques struggle to monitor and that have made it difficult to make accurate predictions.
该项目采用实时连续监测技术追踪气相N_2O排放的日变化与季节性波动。这些动态变化是传统建模技术难以捕捉的，也是导致排放预测准确性不足的主要原因。

The gas is being collected using a closed hood connected to a mobile gas analyser. The hoods are purpose-made for the project, with sensors for temperature and pressure which record the sampling conditions and is equipped with preventive maintenance mechanisms to ensure the collection of high-quality and representative gas samples.
该系统使用闭式集气罩连接移动气体分析仪进行气体收集。集气罩专为项目定制，配备温度和压力传感器以记录采样环境参数，并集成预防性维护机制，确保采集的气体样本具有高精度和代表性。

The collected data is being combined with other information about the treatment process and measurements of nitrous oxide in the liquid phase by the water board partners to arrive at digital twins with which predictions can be made about nitrous oxide emissions and the conditions that drive nitrous oxide formation. These digital twins can be used to develop control and nitrous oxide emission mitigation strategies.
收集到的数据包括处理过程的其他数据参数以及水务局合作伙伴提供的液相N_2O浓度数据。基于上述数据构建数字孪生模型，用于预测N_2O排放趋势、识别其生成驱动条件，并开发排放控制与减排策略。

What does the project hope to learn?
该项目旨在探索哪些关键问题?

The project will help the partners gain a more accurate understanding of the nitrous oxide footprint of wastewater treatment plants. The data will be used to be create models that will provide valuable insights into the underlying processes involved in the production and emissions of the greenhouse gas.
该项目将帮助合作伙伴精确量化污水处理厂的N_2O排放特征，通过实时监测数据，建立N_2O生成与排放的机理模型，为温室气体产生和排放的潜在过程提供有价值的见解。

This knowledge will ultimately allow end-users to evaluate the effectiveness of the different mitigation strategies they employ can minimise nitrous oxide emissions from treatment plants. The end goal, therefore, will be to gain enough knowledge of the processes involved in nitrous oxide formation, emission rates, and the effectiveness of mitigation techniques to offer measurable and robust reductions in emissions from sewage treatment plants and processes.
这一知识体系将最终赋能终端用户，使其能够科学评估现有减排策略对污水处理厂N2O排放的抑制效能，从而最大限度地减少处理厂的N2O排放。因此，该项目的终极目标是通过系统解析N2O的生成过程及其动态排放规律，为行业提供可量化、可复制的N2O减排路径，实现污水处理厂温室气体排放的实质性下降。

OPTICAL FIBRE DETECTS ARSENIC CONTAMINATION
光纤传感，砷毒无踪

Researchers at the Indian Institute of Technology Guwahati, India, have developed a novel tool that can detect arsenic in drinking water. The optical fibre sensor provides a simple method of real-time detection of extremely low levels of the toxic heavy metal.
印度古瓦哈提理工学院 (Indian Institute of Technology Guwahati) 的研究人员开发了一种新型工具，能够检测饮用水中的砷。其中的光纤传感器提供了一种简单的方法来实时检测极低浓度的有毒重金属。

Why is arsenic detection necessary?
为什么需要检测砷?

Arsenic is a naturally occurring heavy metal that is found in the earth's crust. It is distributed throughout the environment and can be found in the air and water, as well as on land.
砷是一种天然存在的重金属，存在于地壳中。它广泛存在于环境中，包括空气、水体及陆地。

According to the World Health Organization, arsenic poses a serious health risk, because:
根据世界卫生组织（WHO）提供的信息，砷对健康构成严重威胁，原因如下：

• It is naturally present at high levels in the groundwater of several countries;
• 多个国家或地区的地下水中天然含有高浓度砷;

• It is highly toxic in its inorganic form;
• 其无机形态具有强毒性;

• Contaminated water used for drinking, food preparation and irrigation of food crops poses the greatest threat to public health from arsenic;
• 饮用水、食品加工及农作物灌溉使用含砷污染水，对公共健康危害

• Long-term exposure to arsenic from drinking-water and food can cause cancer and skin lesions. It has also been associated with cardiovascular disease and diabetes. In utero and early childhood exposure has been linked to negative impacts on cognitive development and increased deaths in young adults;
• 通过饮用水和食物长期接触砷可能导致癌症、皮肤损伤，并与心血管疾病、糖尿病相关。孕期及幼年接触会损害认知发育，增加青壮年死亡率。

• The most important action in affected communities is the prevention of further exposure to arsenic by provision of a safe water supply.
• 受影响地区最紧迫的行动是要通过提供安全饮用水，来防止进一步接触砷。

In a 2022 report, the WHO stated that 'an estimated 140 million people in at least 70 countries have been drinking water containing arsenic at levels above the WHO provisional guideline value', and that as many as '220 million people are at risk of exposure to elevated arsenic concentrations in groundwater'.
WHO在2022年的一份报告中指出，全球有至少70个国家约1.4亿人的饮用水中砷浓度超过WHO临时指导值，而多达2.2亿人面临接触高浓度砷地下水的风险。

The countries most exposed to arsenic include the USA and China, but others are located in Central America, South America and Asia, including India, Pakistan and Bangladesh.
砷污染最严重的国家包括美国和中国，其他高风险地区则分布在中美洲、南美洲及亚洲（如印度、巴基斯坦、孟加拉国）。

Contamination of water occurs when natural geological processes release the arsenic from rocks and soil into groundwater. This process can be accelerated or brought on by industrial processes such as mining, industrial waste disposal and use of arsenic-based pesticides.
砷污染通常源于自然地质过程，如岩石和土壤中的砷会释放到地下水中；但工业活动，如采矿、工业废物排放以及含砷农药使用等会加速这一过程。

Research published in Applied Optics
发表于《Applied Optics》的研究

The research undertaken by Professor Sunil Khijwania and PhD student Fatima Banoo at the Department of Physics, Indian Institute of Technology Guwahati was published in the Applied Optics journal under the title, Localized Surface Plasmon Resonance based Novel Optical Fiber Arsenic Ion Sensor Employing Al_2O_3/GO Nanocomposite.
印度理工学院古瓦哈提分校物理系的Sunil Khijwania教授与博士生Fatima Banoo进行的这项研究发表在《Applied Optics》期刊上，论文标题为《基于Al_2O_3/GO 纳米复合材料的局域表面等离子体共振的新型光纤砷离子传感器》。

The editors of the journal labelled the breakthrough, a 'new cost-effective tool paves the way for household water quality monitoring, helping combat arsenic contamination'. The technology has the potential to be used at the household level for personal water quality monitoring.
期刊编辑将这一突破性技术评价为"一种经济高效的新工具，为家庭水质监测铺平道路，助力对抗砷污染"。该技术未来有望应用于家庭场景，实现个人水质监测。

Lead researcher Sunil Khijwania told media: "Consuming arsenic-contaminated water can lead to severe health conditions including arsenic poisoning and cancers of the skin, lung, kidney and bladder. By creating a sensor that is sensitive, selective, reusable and

cost-effective, we aim to address the need for a reliable and user-friendly tool for routine monitoring, helping to protect communities from the risks of arsenic exposure."
首席研究员Sunil Khijwania向媒体表示："饮用砷污染水可引发严重健康问题，包括砷中毒及皮肤癌、肺癌、肾癌和膀胱癌等。通过开发一种高灵敏度、高选择性、可重复使用且成本低廉的传感器，我们希望可以满足日常监测对可靠且易用工具的需求，以帮助社区抵御砷暴露风险。

Sensors are being developed for home use that can detect a number of contaminants in drinking water, such as PFAS.
目前，用于检测饮用水中多种污染物（如PFAS）的家用传感器也在开发中。

What can the sensor do?
该传感器有何功能?

The sensor uses an optical fibre and an optical phenomenon known as localised surface plasmon resonance. It has been used to detect arsenic levels as low as 0.09 parts per billion (ppb), which is 111 times lower than the maximum permissible limit of 10 ppb established by the World Health Organization.
该传感器利用光纤及一种称为局域表面等离子体共振的光学现象，可检测低至0.09 ppb（十亿分之零点零九）的砷浓度，比世界卫生组织（WHO）规定的最大允许限值（10 ppb）低111倍。

Crucially, the sensor performed reliably when tested on real drinking water samples from diverse locations and conditions.
关键的是，该传感器在不同地区和水质条件下的真实饮用水样本测试中

Khijwania added: "The highly sensitive sensor provides analysis within just 0.5 seconds and demonstrates a high degree of reusability, repeatability, stability and reliability, making it a powerful tool for monitoring and ensuring safer water quality. In the future, this technology could make it much easier for people to check whether their drinking water is safe, potentially saving lives by preventing exposure to harmful arsenic levels."
Khijwania补充道："这种高灵敏度传感器可在0.5秒内完成分析，并具备高度可重复使用性、重复性、稳定性及可靠性，是监测和保障水质安全的强效工具。未来，该技术将显著简化居民饮用水安全检测流程，通过预防有害砷暴露，有望挽救无数生命。"

How does the sensor detect minute arsenic levels?
传感器如何检测微量砷?

Arsenic can be detected using conventional spectroscopy methods, and while these are accurate and sensitive, they require expensive equipment that is time-consuming and complicated to use, prohibiting use within most home environments.
传统光谱方法虽能精准检测砷，但因依赖昂贵设备、操作复杂且耗时，难以在家庭环境中普及。

Khijwania and his team developed an optical fibre sensor that not only has a low detection limit but is also cost-effective and user-friendly enough for routine arsenic monitoring in drinking water.
Khijwania团队开发的光纤传感器不仅检测限低，还具有成本效益和易用性，适用于饮用水砷污染的日常监测。其核心技术包括：

Researchers coated the inside core of a fibre with gold nanoparticles and a thin layer of a unique nanocomposite composed of aluminium oxide and graphene oxide, which selectively binds to arsenic ions.
研究人员通过在光纤纤芯表面修饰金纳米颗粒，并覆盖一层Al_2O_3/GO纳米复合材料，来选择性吸附砷离子。

A portion of the light traveling through the core also extends into the surrounding fibre cladding due to the evanescent wave created by total internal reflection. By removing the cladding in a small section of the fibre, this wave is exposed to the environment.
由于全内反射产生的倏逝波，穿过核心的一部分光也延伸到周围的光纤包层中。通过去除一小部分光纤的包层，该倏逝波得以与环境直接接触。

As light travels through the optical fibre, the evanescent wave interacts with gold nanoparticles, triggering localised surface plasmon resonance. The researchers describe this as 'a phenomenon where electrons on the nanoparticle surface collectively oscillate in response to specific light wavelengths'.
当光线通过光纤时，倏逝波与金纳米颗粒相互作用，触发局域表面等离子体共振，即纳米颗粒表面的电子在特定波长光激发下发生集体振荡。

Crucially, if arsenic is present, it will bind to the nanocomposite, causing a measurable shift in the surface plasmon resonance wavelength and enabling accurate detection of trace arsenic in water.
若水中含砷，砷离子与纳米复合材料结合后，会改变等离子体共振波长，通过检测这一波长偏移即可精确量化痕量砷。

Developing a home-use application for the sensor
开发一种家用的传感器应用程序

Real-world testing was performed on drinking water samples collected from different locations around the city of Guwahati. While the tests proved that the sensor was ready for real-world use, the researchers noted that wider adoption of the technology would only truly be possible with an application that was cheaper and easier to use in the home environment.
研究团队对印度古瓦哈提市多个地点采集的饮用水样本进行了实地测试。尽管测试证明该传感器已具备实际应用条件，但研究人员指出，唯有开发出成本更低、操作更简便的家用版设备，才能推动这项技术的大规模普及。

Khijwania added: "These investigations established that the proposed optical fibre sensor offers a highly sensitive, selective, fast, cost-effective, straightforward and easy solution for arsenic detection in real field conditions. In the long-term, this new approach could potentially be modified to create a new wave of affordable and accessible environmental monitoring tools."
Khijwania表示："这些研究证实，所提出的光纤传感器在实地砷检测中展现出高灵敏度、高选择性、快速响应、经济高效且操作简便等优势。从长远看，该技术方案经改良后，或可催生新一代经济型环境监测设备，覆盖更多污染物检测场景。"

TEXAS USES PURIFIED WASTEWATER IN DRINKING SYSTEM
德克萨斯州首创再生水直输管网

EPWater, located in El Paso, Texas is spending close to €282 million on an Advanced Water Purification Facility that will transform treated effluent from wastewater plant into fresh drinking water.
德克萨斯州 El Paso 市的 EPWater 公司正斥资近 2.82 亿欧元建设一座先进水净化设施，该设施可将污水处理厂的处理出水转化为干净饮用水。

From facility to distribution system
从设施到输配系统

The water reuse facility will be the first in the state of Texas that will send the treated water straight into the water distribution system. The utility states that it will be the most sophisticated development in water reuse anywhere in the USA.
该再生水设施将成为德克萨斯州首个将处理出水直接接入供水输配系统的项目。EPWater表示，这将是美国境内技术最先进的再生水工程。

Located in the Chihuahuan Desert, EPWater draws upon a combination of river water when available, fresh groundwater and desalinated groundwater. The facility will purify water that already has undergone an extensive treatment process at the nearby Bustamante Wastewater Treatment Plant in El Paso's Mission Valley. The plant will produce up to 10 million gallons per day of water to supplement the city's drinking water supplies.
位于奇瓦瓦沙漠的埃尔EPWater水务公司，其水源包括季节性河水、天然地下水及淡化地下水。该再生水设施将对El Paso市Mission谷附近Bustamante污水处理厂已深度处理的水体进行再净化，每日可生产高达1000万加仑的再生水，来补充城市饮用水供应。

Gilbert Trejo, vice president of Operations and Technical Services at EPWater, told local media: "This facility will be a game changer for El Paso and other arid communities across the globe facing drought challenges. The engineering and water community know and understand that these treatment processes produce a very high-quality water."
EPWater运营与技术服务副总裁Gilbert Trejo向当地媒体表示："该设施将为El Paso市及全球面临干旱挑战的干旱社区带来颠覆性突破。工程界与水务界深知，此类处理工艺可产出品质卓越的出水。"

What is purified water?
何为净化水?

Purified water is simply water that has been cleaned to a high standard using advanced waste and filtration processes. The purified water is normally reused in industrial and agricultural applications, but the technology has advanced far enough for it to be used for human consumption.
净化水是指通过先进过滤与处理工艺达到高洁净标准的水体。此类水通常回用于工业与农业领域，但随着技术进步，其品质已提升至可供人类饮用的级别。

Where the Advanced Water Purification Facility differs from other potable reuse plants in the USA is that rather than be returned to treatment plants or blended with other water sources, EPWater plans a direct-to-distribution approach, with the purified water being sent directly to the city's drinking water distribution system.
EPWater先进水净化设施的独特性在于：不同于美国其他饮用水回用厂将处理水返回水厂或与其他水源混合的常规路径，该设施采用"直输管网"模式——净化水将直接注入城市饮用水输配系统。

Five steps to purified drinking water
净化水五步工艺

The facility will use a five-step process to clean and purify the water it receives from the local wastewater treatment plant:
该设施将通过五步工艺对来自当地污水处理厂的水体进行深度净化：

- Step 1: Membrane filtration serves as the primary barrier for particles and microorganisms.
- 步骤一：膜过滤作为首道屏障，去除颗粒物与微生物。

- Step 2: Reverse osmosis removes salt and organic chemicals. It provides an additional barrier against microorganisms.
- 步骤二：反渗透去除盐分与有机化合物，并构建第二道微生物屏障。

- Step 3: Advanced oxidation, with ultraviolet light and hydrogen peroxide, serves as the third barrier that destroys any remaining organic chemicals.
- 步骤三：高级氧化，通过紫外光与过氧化氢协同作用，去除残余有机化合物，形成第三道屏障。

- Step 4: Granular activated carbon eliminates excess hydrogen peroxide and trace chemicals.
- 步骤四：颗粒活性炭吸附清除过量的过氧化氢及微量化合物质。

- Step 5: Chlorine disinfection is the final barrier, ensuring clean water while it reaches home and business taps.
- 步骤五：氯消毒作为终端屏障，确保输抵用户终端的水质安全。

Reclaimed water in El Paso
El Paso再生水计划

The need for new and sustainable water sources for El Paso increases as the city's population increases and as climate change affects upstream sources. EPWater's water strategy sees purified water as a sustainable, drought-proof resource, which will grow in volume as the city's population grows — more people, more waste, more purified water. Not all reclaimed water will be used for the drinking system, however, with the city under obligation to return some water to the river system under the Clean Water Act.
随着El Paso市人口增长及气候变化对上游水源的冲击，该市对新型可持续水源的需求日益迫切。EPWater的水务战略将净化水视为抗旱型可持续资源——城市人口越多，污水量越大，净化水产能也随之增长。但依据《清洁水法案》，并非所有再生水都将注入饮用水系统，部分水体需回补河流生态系统。

The use of 'reclaimed water' in El Paso goes back to 1963, although it was in the 1940s that treated wastewater was first returned to the Rio Grande. The latest facility was given approval by the Texas Commission on Environmental Quality following a pilot that began in 2016. The pilot facility was located at the Bustamante Wastewater Treatment Plant and used a four-stage process purify cleaned wastewater.
El Paso的"再生水"利用史可追溯至1963年，但早在1940年代，处理出水就已首度回灌至格兰德河（Rio Grande）。该新设施在2016年启动试点后，获德克萨斯州环境质量委员会（TCEQ）批准建设。试点设施位于Bustamante污水处理厂内，采用四步工艺净化水体。

Water from the facility was tested and analysed at state-certified laboratories. Thousands of samples confirmed that the purified water met and at times bettered all primary and secondary drinking water standards.
该设施的水在国家认证的实验室进行了测试和分析。数千份样本证实，净化水不仅完全达标且时常优于所有一级和二级饮用水标准。

Trejo added: "What we are doing here in El Paso is going to change the water industry."
Trejo强调："我们在此的实践将改写水务行业格局。"

COMPACT TREATMENT PLANT BRINGS SECURITY TO RURAL LAOS
小型水厂：解锁老挝农村水安全韧性新范式

Dutch-based non-profit World Waternet is working with UNICEF on the construction of a compact treatment plant that will provide thousands of people in rural Lao People's Democratic Republic (Lao PDR) with safe drinking water.
荷兰非营利组织 World Waternet 正携手联合国儿童基金会（UNICEF），在老挝人民民主共和国（简称老挝）农村地区建设一座小型水处理厂。该项目建成后，将为当地数千名农村居民提供安全饮用水。

Collaboration key to water security
协作是水安全的关键

World Waternet and UNICEF are working with Nam Papa (PNP) Luang Namtha (the local public water utility), Nam Saat (a Department of Hygiene programme responsible for the development of water supply and sanitation in rural areas), the Ministry of Public Works & Transport and Ministry of Health.
World Waternet与联合国儿童基金会正联合琅南塔省Nam Papa（PNP）公共供水公司、农村地区供水和卫生发展部Nam Saat、老挝公共工程与交通部以及卫生部，共同推进该项目。

Together, the collaboration is constructing a compact water treatment plant in the Vieng Phouka district in northern Lao PDR. The €700,000 project is set for completion in December 2026, and when fully operational will provide nearly 2,000 people in Nam Fa, La Mon, and Nam Kieng with clean drinking water and improved sanitation.
多方合作将在老挝北部的Vieng Phouka地区建设一座小型水处理厂。该项目总投资70万欧元，计划于2026年12月竣工，全面投入运营后可为Nam Fa、La Mon和Nam Kieng村的近2000名居民提供清洁饮用水，并显著改善当地卫生条件。

Addressing the urgent need for reliable water services in rural Laos
解决老挝农村可靠供水的紧迫需求

Families in rural Lao PDR struggle to access safe water, relying on seasonal groundwater or making long trips to collect untreated river water. Water security is becoming harder with rising temperatures and growing pressure on local supplies.
在老挝的农村地区，许多家庭难以获取安全饮用水，只能依赖季节性地下水或长途跋涉取用未经处理的河水。随着气温上升和本地供水压力加剧，保障稳定用水正变得愈发困难。

Despite progress, 15 per cent of Lao PDR's population still lacks water services, leaving over one million people without water access. Across the country, only 18 per cent of people have safely managed water, and 20 per cent (1.5 million people) lack basic sanitation.
尽管取得了一定进展，老挝仍有15%的人口（超过100万人）无法获得供水服务。全国范围内，仅18%的居民享有安全管理的饮用水，20%的人（约150万人）甚至缺乏基本卫生设施。

The figures clearly highlight the need for sustainable water and sanitation solutions in the country. As part of the project, World Waternet will use funding from UNICEF, the WaterWorX Climate Adaptation Fund, and Nam Papa Luang Namtha, to connect 354 households to the Nam Papa water system, ensuring clean water and better hygiene.
这些数据清晰表明，老挝亟需可持续的供水和卫生解决方案。作为项目的一部分，World Waternet将利用联合国儿童基金会、WaterWorX气候适应基金以及琅南塔省PNP公共供水公司提供的资金，将354户家庭接入PNP供水系统，以确保清洁用水并提升卫生水平。

Clean water and sanitation for all
人人享有清洁水和卫生设施

Lao PDR is ranked 40th in the Environmental Change Institute's Climate Change Resilience Index (CCRI). It is prone to extreme water events, including floods, and droughts.
根据环境变化研究所发布的气候变化韧性指数（CCRI），老挝位列全球第40位，表明该国易受洪水、干旱等极端水文事件影响，水安全形势严峻。

Communities in Vieng Phouka rely on untreated water systems that often fail due to contamination and seasonal shortages. This project strengthens water security and resilience while supporting Sustainable Development Goal 6: Clean Water and Sanitation for All, and forms part of World Waternet's mission to improve water services for over six million people by 2030.
Vieng Phouka社区长期依赖未经处理的水源系统，因此这些系统常因污染和季节性缺水而崩溃。当前项目通过增强供水韧性与安全性，助力实现联合国可持续发展目标6——"人人享有清洁水和卫生设施"，并成为World Waternet战略计划的一部分。该组织计划到2030年，为全球超过600万人改善供水服务。

Marc Overmars, chief water, sanitation and hygiene and climate resilience, UNICEF Lao PDR, said: "For nearly 2,000 people in Vieng Phouka, this project means no more hauling water from unsafe sources. Now, families will have safe water right at home, along with better sanitation and hygiene. With reliable access, children can stay healthier and focus on schoolwork, and their communities — significantly improving everyone's quality of life."
联合国儿童基金会老挝办事处水、环境卫生与个人卫生及气候韧性领域负责人Marc Overmars表示："对于Vieng Phouka地区近2000名居民而言，该项目意味着他们不再需要从危险水源中长途取水。现在，家家户户都能在家里喝到安全的水，同时享有更完善的卫生设施与个人卫生条件。稳定供水将帮助儿童保持健康、专注学业，并显著提升社区整体生活质量。"

The compact treatment plant
小型水处理厂

The treatment plant will provide safe water to communities in need. It is being constructed on the site of a repurposed rubber plantation, helping to ensure minimal impact to the local plant environmental.
这座水处理厂将为有需求的社区提供安全饮用水。其选址于一处改建的橡胶种植园旧址，最大限度降低了对当地植被环境的影响。

During the course of the project, World Waternet will build the treatment plant and establish an intake from the Nam Fa River, which will be the source water for the project, install main water meters and a distribution pipeline to deliver 24/7 access to safe drinking water. This initiative strengthens local water resilience, improving both public health and sustainability.
在项目实施过程中，World Waternet负责建设水处理厂，并从项目水源——南法河（Nam Fa River）建立取水口，安装主水表及输水管网，最终实现安全饮用水全天候供应。该举措将增强区域供水韧性，提升公共卫生水平并促进可持续发展。

Peter Jansen, COO World Waternet, told Aquatech Online: "The treatment process will begin with a pre-sedimentation stage, involving flocculation with alum mixing, before a sedimentation stage using sand filtration, before chloride treatment, and finally clear water storage. Water will be distributed to villages by means of gravity through surface pipes."
World Waternet首席运营官Peter Jansen在接受Aquatech Online采访时表示："水处理流程将分为多阶段：首先通过明矾混合絮凝进行预沉淀，随后进入砂滤沉淀阶段，再进行氯化消毒处理，最终储存于清水池。净化后的水将通过地表管道，依靠重力输送至各村。"

Jansen also told media: "This is a key step toward strengthening climate resilience and local water management. The plant's compact design ensures mobility and long-term impact."
Jansen还向媒体强调："这是增强气候韧性和地方水资源管理的关键一步。工厂的紧凑型设计既保证了设施可迁移性，也确保了长期效益。"

He added: "This project is a true example of peer-to-peer collaboration, built on trust, expertise, and sustainable partnerships with Nam Papa Luang Namtha and our dedicated partners."
他补充道："该项目是同行协作的典范，其成功建立在与琅南塔省PNP公共供水公司及合作伙伴的互信关系、专业知识和可持续合作基础之上。"

The potential to create a ripple effect
激发示范效应的潜力

A recent Nam Papa survey revealed that 90 per cent of households in the targeted villages were willing to pay for a more reliable water supply, highlighting strong local demand. This willingness is seen by World Waternet as a key driver for sustainable water services because it ensures a steady revenue stream for operation and maintenance.
琅南塔省PNP公共供水公司近期调查显示，在目标村庄中，有90%的家庭愿意为更可靠的供水服务付费，这凸显出强劲的当地需求。World Waternet将这一付费意愿视为可持续供水服务的关键驱动力，因为它确保了运营和维护的稳定收入来源。

With financial commitment from the community, local water operators can invest in infrastructure improvements, expand services, and enhance reliability. Moreover, strong demand increases local ownership, making the system more resilient in the long run.
有了社区的经济投入，当地水务运营商可以投资升级基础设施、扩大服务范围并提升供水可靠性。此外，强烈的需求将增强社区自主管理意识，从而在长期内提升系统的抗风险能力。

This finding also signals to policymakers and investors that improved water services in the region are both needed and viable, paving the way for long-term impact.
这一发现也在向政策制定者与投资者释放信号：改善该地区供水服务既迫切又切实可行，从而为创造长期效益奠定了基础。

The project partners believe the model has potential for expansion into nearby villages and lays the groundwork for scalable, sustainable water infrastructure in northern Laos. If successful, it can serve as a model for future initiatives that seek to strengthen water security across the region.
项目合作方认为，该模式具备向周边村庄推广的潜力，并为老挝北部可推广的可持续水基础设施建设奠定基础。若取得成功，该项目将成为未来区域性水安全强化行动的示范案例。

AQUA TECHNOLOGY

CERAMIC MEMBRANES TREAT WATER FOR AI GIGAFACTORY
陶瓷膜水处理技术赋能AI超级工厂

A supercomputing data centre in Memphis, USA, will use treated municipal wastewater to cool its servers. The centre is being built by Elon Musk to house his xAI project, and will be supplied with water by what the projects claims to be the world's largest ceramic membrane bioreactor (MBR).
美国孟菲斯（Memphis）市一座超级计算数据中心将采用市政再生水冷却服务器。该中心由 Elon Musk 为承载其 xAI 项目而建，其供水系统宣称将搭载全球最大规模的陶瓷膜生物反应器（MBR）技术。

CERAFILTEC membranes will treat the water
CERAFILTEC陶瓷膜将用于水处理

CERAFILTEC, headquartered in Germany, is a global leader in ceramic ultrafiltration membrane technology. It will deliver its most advanced ceramic membrane technology for use in the project, which is being fast-tracked by xAI. The fact the project needs the world's largest MBR reveals both the demand for water in AI data centres and that there is a growing demand for ceramic membrane solutions for wastewater treatment that supplies such ventures.
总部位于德国的CERAFILTEC公司是陶瓷超滤膜技术领域的全球领导者。该公司将为xAI加速推进的超级计算数据中心项目提供最先进的陶瓷膜技术。该项目需配置全球最大规模的膜生物反应器（MBR），这既反映出AI数据中心对水资源的庞大需求，也揭示出此类项目正推动污水处理领域对陶瓷膜解决方案的需求激增。

The company was chosen to supply ceramic membranes to the plant attached to the xAI data centre for a number of reasons: technological competence, advanced ceramic membrane solution, and ability to meet an accelerated delivery schedule.
CERAFILTEC之所以被选为xAI数据中心配套水厂的陶瓷膜供应商，源于多重优势：卓越的技术实力、行业领先的陶瓷膜解决方案，以及满足紧急交付周期的能力。

Mark Carroll, xAI wastewater engineer, is

leading the design and construction of the recycling plant, he told media: "CERAFILTEC's robust ceramic membrane technology meets our demanding requirements for ultra-reliable and efficient water treatment to support our state-of-the-art supercomputer."
xAI废水处理工程师Mark Carroll负责再生水厂的设计与建设。他接受媒体采访时表示："CERAFILTEC的陶瓷膜技术具备极强的稳定性，完全满足我们对水处理系统超强可靠性与高效性的严苛要求，从而支撑尖端超级计算机的持续运行。"

He added: "This partnership enables us to set new benchmarks in both technology and water efficiency, ensuring vital cooling water supply for our high-performance computing systems with no impact on local potable water supplies."
他补充道："此次合作将助力我们在技术性能与用水效率方面树立新标杆，既能确保高性能计算系统的冷却水稳定供应，又不会挤占当地饮用水资源。"

CERAFILTEC's ceramic membranes overcome a number of issues associated with more traditional membrane solutions, such as fibre breakages and delicate cleaning regimens.
CERAFILTEC陶瓷膜克服了传统膜技术的固有缺陷，例如纤维易断裂、清洗流程复杂等问题。

A company statement, read: "In a rapidly expanding data centre industry, effective, sustainable water management is essential to maintain high operational performance. CERAFILTEC's solution is designed to meet these stringent requirements."
CERAFILTEC在官方声明中强调："在快速扩张的数据中心行业，高效可持续的水资源管理是维持高运营性能的核心。我们的解决方案专为满足这些严苛要求而设计。"

Supercooling supersized AI data centres
高效冷却超大规模AI数据中心

Elon Musk has stated that the xAI date centre will provide "the most powerful AI training cluster in the world." The company, which is headquartered in San Francisco, USA, has the stated goal of 'pioneering the implementation of artificial intelligence to expedite human scientific discovery'.
Elon Musk表示，xAI数据中心将成为"全球最强大的人工智能训练集群"。这家总部位于美国旧金山的公司宣称，其使命是"开拓人工智能技术应用，加速人类科学发现进程"。

Dr Torsten Wintergerste, who recently joined CERAFILTEC as CEO, from the Swiss technology company Sulzer, where he served as president of the Chemtech division, told media of the partnership: "Our DNAs are very aligned, and together we are shaping the future of both AI and water treatment."
新任CERAFILTEC首席执行官Torsten Wintergerste博士向媒体谈及此次合作："我们的核心理念高度契合，双方正携手塑造人工智能与水处理技术的未来。"
Wintergerste此前任职瑞士Sulzer公司，担任化工技术事业部总裁。

The MBR will treat municipal wastewater and provide 49.2 MLD (13 MGD) of reused water to cool its servers and supercomputers in the Memphis facility.

该膜生物反应器（MBR）将处理市政污水，每日提供4920万升（约合1300万加仑）再生水，用于冷却孟菲斯市设施内的服务器与超级计算机。

Additional water benefits
附加水效益：解锁水资源的多维价值

The MBR facility will also have additional benefits for the wider area with its capacity designed to provide more water than needed by xAI. The surplus water will be supplied to local industries with clean water needs which will not only conserve drinking water in the region and benefit local communities, but it will also reduce pressure on the Memphis Sands Aquifer.
该MBR设施还将为更广泛区域创造额外效益——其供水能力不仅能满足xAI需求，更将富余的再生水输送至本地亟需清洁水源的工业用户。此举既能有效保护区域饮用水资源、惠及社区民生，又能显著缓解孟菲斯市砂层含水层的压力。

The aquifer spans portions of eight states, ranges over 7,000 square kilometres and to depths of 3,000 metres. Much of the water in the aquifer fell as rain more than 2,000 years ago. However, overextraction and pollution both offer threats to this vast resource of freshwater.
孟菲斯砂层含水层地跨美国八州，覆盖面积逾7000平方公里，最大深度达3000米。该含水层中大部分水体源自2000多年前的古降水补给，堪称"液态化石"。然而，过度开采与工业污染正使这一历经千年形成的淡水资源面临枯竭危机。

Dr Juergen Hambrecht, chairman of CERAFILTEC, told media: "Our collaboration with xAI showcases the transformative potential of ceramic membranes in water and wastewater treatment, offering unparalleled reliability and efficiency. This project establishes a new industry benchmark and reinforces CERAFILTEC's role as a global leader in innovative water solutions."
CERAFILTEC董事会主席Juergen Hambrecht博士向媒体强调："与xAI的合作展示了陶瓷膜技术在水处理领域的范式革命——其展现的可靠性与能效边界突破，正在重新定义行业标准。这个标杆项目不仅印证了我们'以技术创新守护水资源'的使命，更巩固了CERAFILTEC作为全球智慧水解决方案拓荒者的领导地位。"

EU INVESTS IN SENSOR TO TRACK POLLUTANTS IN WATER BODIES
欧盟注资新型传感器技术：水体污染物精准追踪

An EU-backed consortium is developing a new photonic (the science of light) sensing platform designed to track invisible threats from petrochemicals, pesticides, heavy metals, and industrial waste in rivers, lakes, and oceans. The sensor will be used detect and prevent environmental disasters before they escalate.
一个由欧盟支持的产学研联盟正在开发新型光子(光科学)传感平台，旨在追踪河流、湖泊及海洋中石油化工品、农药、重金属与工业废料等肉眼不可见的隐形威胁。该传感器将通过实时监测与预警，在环境灾害升级前实现精准防控。

The science of light exposes pollutants in water
光技术解码水体污染物

The European Commission has invested €4.6 million in developing the platform that combines photonics with electrochemistry to detect hidden toxins and pollutants, which often remain undetected by conventional monitoring devices.
欧盟委员会已投入460万欧元研发新型监测平台，该平台通过光子学与电化学技术融合，可检测传统设备难以识别的隐蔽毒素与污染物。

The multi-sensor uses lasers and photonic circuits to offer a cheaper, more sustainable solution than currently available technologies.

The development is part of the EU-funded IBAIA (Innovative environmental multi-sensing for waterbody quality monitoring and remediation assessment) project.
该多参数传感器采用激光与光子集成电路技术，相比现有监测手段，其成本更低且更具可持续性。这项创新隶属于欧盟资助的IBAIA（水体质量监测与修复评估创新环境多参数传感）项目。

Radwan Chahal, project manager at IBAIA, told media: "Environmental water pollution might be one of the most urgent yet overlooked crises of our time. However, IBAIA's sensing technology is set to become a gold standard in water monitoring, protecting our health and our environment."
IBAIA项目经理Radwan Chahal向媒体表示："水体污染或是当今最紧迫却最被低估的环境危机。而IBAIA的传感技术将重新定义水质监测的黄金标准——既能守护公众健康，又能为生态修复提供精准数据支撑。"

The need to update, upgrade and speed up pollutant analysis
更新、升级与加速污染物分析的需求

Advances in the chemical analysis of water bodies and sources have revealed the alarming extent at which industrial and agricultural contaminants - such as hydrocarbons, drug residues, or nutrient salts like nitrates and phosphates - are present and the damage they are causing to rivers and coastal waters.
化学分析技术的进步揭示了水体和污染源中工业与农业污染物的惊人存在规模——碳氢化合物、药物残留及硝酸盐、磷酸盐等营养盐类正以空前速度侵蚀河流与近岸海域，造成不可逆的生态创伤。

The combined effects of these pollutants, often referred to as a cocktail effect, not only threaten water-based ecosystems and water quality, but they have also been linked to serious health issues in humans, such as immune system weakening, reproductive issues, congenital anomalies, and cancer.
这些污染物的综合影响（学界称为"鸡尾酒效应"），不仅威胁水生生态系统和水质安全，更与人类免疫系统衰退、生殖功能障碍、先天性异常乃至癌症等重大健康风险直接相关。

Accurate measurement of these pollutants, conducted in laboratories using complex techniques like mass spectrometry and chromatography, is slow, expensive, infrequent, and reactive, often taking many days or weeks to reveal contamination has occurred. By the time a pollutant has been accurately identified the public and ecosystems have been at risk for some time.
当前主流的实验室检测技术（如质谱分析法、色谱分析法）虽能精确识别污染物，却存在四大瓶颈：检测周期长达数日乃至数周、成本高昂、采样频率受限、结果严重滞后。当实验室最终确认污染时，公众健康与生态系统往往已暴露于风险中数日之久。

Four detection methods in one
四种检测技术的集成突破

The IBAIA's multi-sensing system integrates four different detection methods into one solution, something the project team calls a 'super sensor'. The sensors offer high levels of accuracy and can detect a greater variety of pollutants across a wider range of substances. Crucially, the sensors offer real-time, in-situ detection, which offers rapid response to pollution events.
IBAIA的多参数传感系统开创性整合四种检测技术于一体，被项目团队誉为"超级传感器"。传感器提供了高水平的准确性，可以在更广泛的物质范围内检测到更多种类的污染物。至关重要的是，传感器提供实时原位检测，可以对污染事件做出快速反应。

IBAIA's system will be tested in real-world condi-

tions, with field trials across Europe with the technology expected to be fully validated within the next few years. The EU believes it will set a new standard for pollution detection and prevention.
IBAIA系统即将在欧洲多地的实地测试中验证性能，预计未来几年内完成全技术链认证。欧盟评估认为，它将为污染检测和预防制定新的标准。

Mid-Infrared (Mid-IR) Sensor–Detecting Organic Chemicals
中-红外（Mid-IR）传感器——检测有机化学物质

IBAIA uses mid-infrared light to identify and measure organic chemicals in water, such as pesticides, industrial solvents, and oil residues.
IBAIA利用中红外光识别并测量水中的有机化学物质，例如农药、工业溶剂和油残留物。

Mid-IR spectroscopy operates on the principle that every chemical leaves its own spectral 'fingerprint' when exposed to infrared light. This sensor reads those signatures with great precision, pinpointing even the faintest traces of industrial waste or oil residues before they enter water supplies.
中红外光谱技术的原理在于，每种化学物质在红外光照射下都会留下独特的光谱"指纹"。该传感器以极高精度读取这些特征信号，甚至能在工业废料或油残留进入供水系统之前，精确定位其最微弱的痕迹。

Izabella Otalega, research and innovation manager at Modus Research and Innovation, told media: "Real-time detection means swift intervention. Pollution can be intercepted before it spreads, and environmental agencies can act before contamination spirals into crisis. In a world where toxic spills and chemical leaks have often been discovered only when it's too late, speed and accuracy are essential."
Modus研究与创新公司的研发与创新经理Izabella Otalega向媒体表示："实时检测意味着可迅速采取干预措施。污染在扩散前即可被拦截，环保机构也能在污染演变为危机之前采取行动。在以往有毒泄漏和化学品泄露往往发现得太迟的背景下，快速响应与精准检测至关重要。"

Visible-Near Infrared (Vis-NIR) Sensor – Detecting Microplastics and Salinity
可见-近红外（Vis-NIR）传感器——检测微塑料与盐度

Microplastics and chemicals are everywhere, drifting through rivers and oceans and even making their way into our food and drinking water. Detecting them has become a laborious and costly process, relying on methods that are too slow to help stop pollutants entering our ecosystems. The 'super sensor' uses visible and near-infrared light to detect microplastics instantly before they vanish into the currents.
微塑料与化学物质无处不在——它们在河流与海洋中漂流，甚至会渗入我们的食物和饮用水中。现有的检测方法耗时费力且成本高昂，依赖的技术效率低下，难以及时阻止污染物进入生态系统。而这款"超级传感器"利用可见光与近红外光，可在微塑料随水流消失前瞬间完成检测。

Otalega added: "Microplastics absorb and reflect light in distinctive ways, which are invisible to the naked eye but glaringly obvious to the precision optics of IBAIA's sensor. In a fraction of the time, it can scan and identify these contaminants in water sources, offering real-time tracking of plastic pollution, at scale, across oceans, rivers, and even drinking water supplies."
Otalega补充道："微塑料对光的吸收与反射具有独特模式，这些特征肉眼无法捕捉，但对IBAIA传感器的精密光学系统却显而易见。它能在极短时间内扫描并识别水源中的污染物，实现对海洋、河流乃至饮用水供应系统中塑料污染的大规模实时追踪。"

Optode Sensor–Measuring Physico-chemical Parameters
光极传感器——测量理化参数

The Optode sensor measures key physico-chemical parameters in water such as pH, oxygen levels, and temperature. These are often the markers of a deteriorating ecosystem.
光极传感器可测量水中的关键理化参数，如pH值、溶解氧含量与温度。这些参数通常是生态系统健康状况恶化的标志性指标。

The sensor is designed to catch these changes early, providing a real-time, cost-effective method for monitoring water health before a crisis unfolds. It uses chemical-sensitive dyes that react to environmental conditions, to deliver precise, continuous measurements of key physicochemical parameters.
该传感器的设计初衷是尽早捕捉这些变化，为水质健康监测提供一种实时且经济高效的方法，从而在水质危机爆发前实现预警。其核心原理是利用对环境条件敏感的化学染料，通过光学响应实现对关键理化参数的高精度、连续性测量。

Electrochemical (EC) Sensor - Detecting Nutrient Salts and Heavy Metals
电化学（EC）传感器——检测营养盐与重金属

Among the most serious threats to water quality are pollutants like nitrates, phosphates, and heavy metals such as lead, mercury, and arsenic. The IBAIA Electrochemical (EC) sensor is designed to detect these contaminants in real time, allowing for faster, more efficient monitoring than traditional lab-based methods.
对水质构成最严重威胁的污染物包括硝酸盐、磷酸盐及铅、汞、砷等重金属。IBAIA电化学（EC）传感器专为实时检测这些污染物而设计，其效率远高于依赖实验室的传统监测方法，可实现更快响应与更精准的水质评估。

It works by measuring the electrical response of these substances when they interact with the sensor surface. IBAIA's electrochemical sensor analyses the electrical reaction upon contact with the sensor's surface while also identifying nutrient salts that contribute to harmful algal blooms, all in real-time.
其工作原理是通过测量污染物与传感器表面接触时产生的电化学反应信号。IBAIA电化学传感器不仅能实时分析这些反应，还能同步识别导致有害藻华的营养盐类，所有检测过程均在瞬间完成。

AQUA TECHNOLOGY

03

Aquatech China 2025
水展新象

Aquatech China是专注水处理全产业链的亚太地区专业展会，覆盖净水、污水处理、给排水管网及泵管阀，过程控制与自动化等领域的主题内容，并始终坚持"专注水行业，覆盖全领域"的办展理念。

AQUATECH 品牌系列水展

专注水行业 覆盖全领域
TOGETHER WE MAKE WATER WORK

Aquatech China 2025
亚洲水技术展览会

荷兰阿姆斯特丹国际水处理展览会·中国展

2025.11.5-7 | 上海新国际博览中心

展会背景
Exhibition Background

Aquatech品牌创立于1968年，作为水处理行业历史悠久的展览会，荷兰阿姆斯特丹国际水处理展览会(Aquatech Amsterdam)至今已有近60年的举办历史。每两年一度的 Aquatech Amsterdam 已成为全球水处理行业的焦点。2023年展会吸引超过800家参展企业和约22,000名专业观众，成为展示水处理技术和服务创新的顶级平台。

随着全球范围内水资源的日益紧张和大众环境保护意识的提升，尤其在中国推行“双碳”目标后，中国的水处理行业迎来了前所未有的发展机遇。荷兰RAI锐昂展览集团决定，对其在华展览 Aquatech China 进行全面升级，并加速该展览在亚太地区的战略布局最大化。

Founded in 1968, Aquatech Amsterdam has been the longest running exhibition in the water treatment industry for nearly 60 years. The biennial Aquatech Amsterdam has become the focal point of the global water treatment industry, and in 2023 the show attracted more than 800 exhibitors and around 22,000 visitors, making it the top platform for showcasing innovations in water treatment technology and solutions.

With water resources becoming increasingly scarce and environmental protection awareness rising globally, and especially with China's “double carbon” target, the water treatment industry in China has never had a better opportunity to grow. RAI Amsterdam has decided to upgrade Aquatech China and maximize its strategic layout in the Asia-Pacific region.

展会介绍
Exhibition Introduction

Aquatech China 2024 亚洲水技术展览会已于12月11-13日在上海新国际博览中心成功举办，本届展会近30,000平方米展示面积，吸引了400多家展商到场参与，超15,000名专业观众近40,000人次莅临现场参观交流，现场近20场精彩同期活动获得了业内人士的广泛认可，为国内水处理行业搭建了国际化交流平台。

Aquatech China 2025 亚洲水技术展览会将于2025年11月5-7日在上海新国际博览中心举办。主办方始终坚持“专注水行业，覆盖全领域”的办展理念，展会全面覆盖水处理全产业链，包括净水、水与污水处理、给排水管网及泵管阀，过程控制与自动化等主题内容。展会同期还将举办2025AQC水技术创新奖颁奖典礼、水舞台、创新展区、国际展团、国际买家交流区、商贸对接、商务考察及10多场行业专业论坛等精彩的同期活动。

2025年我们将继续前行，敢于突破，勇于创新，促进拓展行业发展空间，助力企业技术发展，引领行业前沿发展！

Aquatech China 2024, held December 11-13 at the Shanghai New International Expo Center, featured a 30,000-square-meter exhibition space. The event attracted over 400 exhibitors and 15,000 visitors. Nearly 20 events and forums took place onsite, establishing the show as a significant international exchange platform.

Aquatech China 2025 will be held November 5-7 at the Shanghai New International Expo Center. Following the theme "Together We Make Water Work," the exhibition covers the complete water treatment industry chain, including:

- Residential & Commercial Solutions
- Water/Wastewater Treatment
- Infrastructure
- Software & Automation

The event will feature an innovation award ceremony, AquaStage presentations, Innovation Lab demonstrations, international pavilions, business matchmaking, industry tours, and over 10 specialized forums.

The 2025 exhibition aims to drive industry innovation, expand development opportunities, and advance technological progress in the water treatment sector.

为何选择我们 WHY CHOOSE US

展会亮点 HIGHLIGHTS

01 海量国际资源 Massive International Resources

荷兰国际水处理展览会唯一在华子展——来自母展的倾力支持，我们携手来自140+个国家和地区的企业和专业买家，打造整合全球资源的水处理盛会。Aquatech拥有近60年的水处理展会经验，我们以水为源，覆盖水处理行业全领域，将展示行业的前沿科技和产品。

Extensive support from Aquatech Amsterdam. Take advantage of Aquatech Amsterdam's global brand influence and share its resources including international exhibitors, visitors, sponsors, partners, knowledge partners & speakers.

02 专注于水，服务于水 Focus on Water, Serve Water

Aquatech拥有近60年的水处理展会经验，我们以水为源，覆盖水处理行业全领域，将展示行业的前沿科技和产品。

Aquatech is a trade show with a history of almost 60 years. The show focuses on water and covers every aspect of the water sector, showing cutting-edge products and technologies.

03 全球商业，跨界合作 Global Business, Cross-border Cooperation

涵盖88+国家和地区，其中海外观众到场5,000+人次，占比12.5%，与跨行业的合作伙伴携手，共同开创商业新天地，探索水处理与商业、医疗、家用、工业等领域的无限可能。

Covering 88+ countries and regions, with 5,000+ overseas visitors, accounting for 12.5% of the total. Collaborating with cross-industry partners, we create a totally new world together and explore the opportunities between water treatment and commercial, healthcare, residential and industrial fields.

04 国际行业联动 International Industry Linkages

Netherlands Water Partnership、Water Alliance、Bluetech、Isle Utilities等数十家水处理相关国际组织的大力支持，我们将搭建一个全球水处理行业联动平台，促进行业的共同发展。

With support from international organizations including the Netherlands Water Partnership, Water Alliance, Bluetech, and Isle Utilities, we provide a global platform for collaboration and advancement in water treatment technology.

05 品牌推广，全球传播 Branding, Global Communications

中外同步，Aquatech China 推广覆盖全球范围，通过LinkedIn、Facebook、Google、Instagram等社交平台和行业媒体，将展会的精彩呈现于世界面前，助您的品牌不论是国内还是在全球范围内迅速传播。

The marketing promotion of Aquatech China is running throughout the whole world by LinkedIn、Facebook、Google、Instagram and other social media, showing the highlights and exhibitor listand help you to improve your brand awareness worldwide.

06 创新与前瞻 Innovation and Foresight

在 Aquatech China 上，我们将打造展示未来水技术的平台，呈现行业最前沿的创新科技。这是一个汇聚创意和前瞻性的舞台，让观众沉浸式体验未来水处理技术的震撼力量。

At Aquatech China, we will show you the latest technologies, displaying state-of-the-art innovation, letting visitors feel the power of the future technologies.

谁来参展
EXHIBITOR RANGE

净水 Residential & Commercial

家用净水系统、前置过滤/中央净水/中央软水/末端净水系统及零部件、商用净水系统、制冷制热净饮机、膜与膜处理技术、滤芯及滤材、其它净水技术与装置

Household water purification solutions, POU filters/POE solutions/Commercial water purification solutions, Water coolers and dispensers, Membrane filtration, Filters and filtration other, Others

水与污水处理 Water / Waste Water Treatment

净水/过滤装置/耗材、生化水处理技术、污泥处理处置、膜与膜处理技术、脱盐装置与海水淡化、水环境综合治理、资源回收及再利用、工程设计及工艺包、成套设备、其他水处理相关技术及设备

Water Filtration, Biological Chemical water treatment, Sludge management, Membrane, Desalination equipment, Water environment, Resource recovery and reuse, Technical parrs for design and installation, Complete sets of equip-ment, Others

给排水管网及泵管阀 Infrastructure

泵、管道/配件、阀门/配件、供水及管网管理、配水系统、储水、修复与维护、水表/测量/调节、其他给排水相关技术及设备

Pumps, Pipes, Valves, Water supply and water management, Distribution, Storage, Maintenance, Meters/ Measuring/ Regulating, Others

过程控制与自动化管理 Software & Automation

自动化管理、过程控制设备、加药设备、检验/测量/调节设备、数据记录和管理、维护设备、智能水表、智慧水务/水互联网 / 大数据其他过程管理相关技术及设备

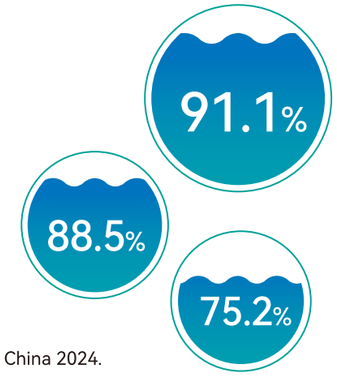
Automation, Process control equipment, Dosing equipment, Detectors/Measuring/ Regulating, Data logging and management Maintenance, Smarr metering, Smart water/ IoW (Internet of Water) / Big Data, Others

展商满意度 Exhibitor Satisfaction

91.1%的展商表示愿意向同行及同业伙伴推荐 Aquatech China 2025
More than 90% of exhibitors said they would like to recommend Aquatech China 2025 to their peers and industry partners.

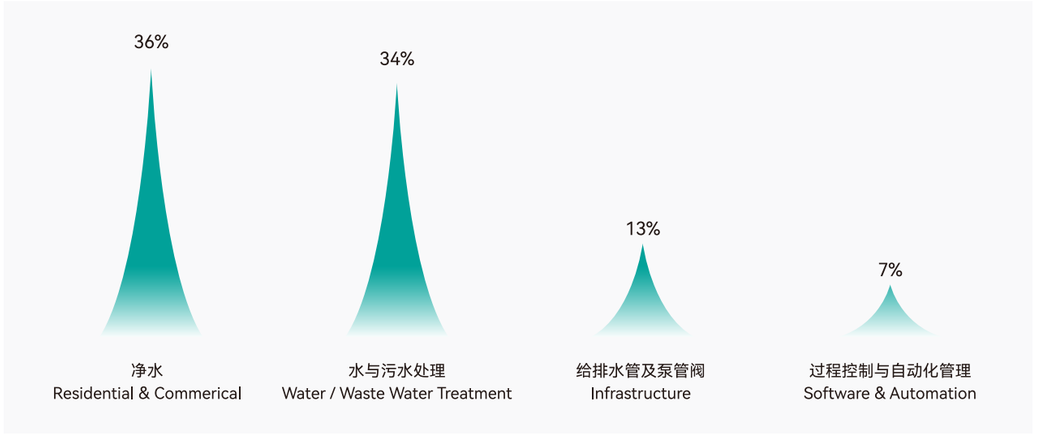
88.5%的展商表示会继续参加 Aquatech China 2025
More than 88% of exhibitors said they would continue to participate in Aquatech China 2025.

75.2%的展商对 Aquatech China 2024 整体展会效果比较满意
More than 75% of exhibitors are satisfied with the overall effectiveness of Aquatech China 2024.



展商分析 Exhibitors Analysis

国内展商 Domestic Exhibitors： 418　　国际展商 Overseas Exhibitors： 34
展商国家 / 地区 Exhibitor Countries / Regions： 11+



净水品牌展商 Residential & Commercial Brand Exhibitors

BWT　AIBOTE 艾波特 净饮设备智造领跑者　聚佰科技集团　迈悦 MoreJoy　KEMFLO 益泰
開能 Canature　Midea　ANGEL 安吉尔　ELKAY 艾肯　LONSID 朗诗德
YUNDA H&H　WaterJoy 水享　OLANSI 澳兰斯　中广电器 饮水科技　润新 RUNXIN

水与污水处理品牌展商 Water / Waste Water Treatment Brand Exhibitors

ROPV 乐普　Litree 立升 全领域专业净水　Wave Cyber 唯赛勃　LEFOO 力夫　SINAP 平板膜专业制造商
CPURE　开能华宇 Canature HuaYu　恩泰科技 NT FILM　ZHENGGUANG Hydrolite　海纳膜
万邦膜　Darlly　水艺 SHUIYI 水环境综合治理运营服务商　ThermoFisher SCIENTIFIC　VATTEN Valves & Controls

* 以上排名不分先后
* The above rankings are in no particular order

谁来参观
VISITOR RANGE

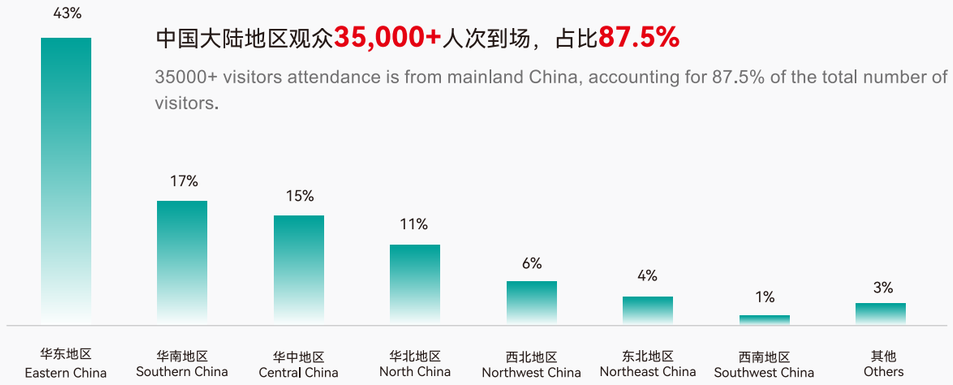
为期三天的展会，共接待行业权威机构、知名品牌及专业观众共计40,000+人次，涵盖88个国家和地区。

The three-day exhibition received a total of 40,000+ visitors from industry organizations, famous brands and professional audiences, covering 88 countries and regions.

国内观众分析 Analysis Of Domestic Visitors

中国大陆地区观众**35,000+**人次到场，占比**87.5%**

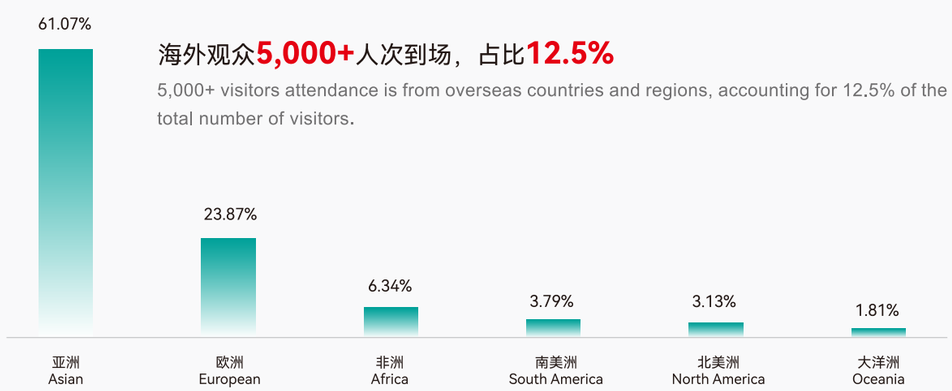
35000+ visitors attendance is from mainland China, accounting for 87.5% of the total number of visitors.



国际观众分析 Analysis of Overseas Visitors

海外观众**5,000+**人次到场，占比**12.5%**

5,000+ visitors attendance is from overseas countries and regions, accounting for 12.5% of the total number of visitors.



业务范围 Analysis Of Business Scope

参观目的 Analysis Of Visiting Purpose

观众满意度 Visitor Satisfaction

90.2%的现场观众对现场展馆、展区规划表示满意

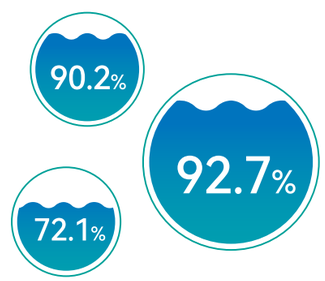
More than 90% of onsite visitors were satisfied with the halls and areas planning.

92.7%的观众表示会继续参观Aquatech China 2025

More than 92% of onsite visitors would like to visit Aquatech China 2025.

72.1%的现场观众对参观登记、进场参观体验表示满意

More than 72% of onsite visitors were satisfied with the registration process and visiting experiences.



创新展区
AQUATECH INNOVATIONLAB

Aquatech China 特别推出“Aquatech InnovationLAB 创新展区”，这是一个专为行业专家、创新人才和技术人才量身打造的专属空间。Aquatech China 倡导自由分享、深入探讨和积极协作，携手共同探索水处理技术的最新前沿及未来趋势。

Aquatech China is pleased to present the Aquatech InnovationLAB, an exclusive space for industry experts, innovators and scientists to meet and exchange ideas. Aquatech China advocates free sharing, in-depth discussion and active collaboration to explore the latest frontiers and future trends of water treatment technology.

国际买家交流区
AQUATECH INTERNATIONAL HUB

为了构建一个全球性的交流与沟通桥梁，International Hub 国际买家交流区作为Aquatech品牌活动的一大亮点，汇集了来自世界各地的买家，跨越地域的障碍和语言的界限自由交流，为国际与中国在行业交流和商业需求方面注入新的视角和活力。

The International Hub connects global buyers by creating a dedicated space for cross-cultural business exchange, fostering new perspectives and opportunities between international and Chinese industry partners.

商贸对接
MATCH-MAKING

Match-making 商贸对接会旨在为国内外展商与买家提供一个独特的交流与合作平台。主办方通过策划与安排现场的对接会日程，使得展商与买家实现精准对接，交流合作意向，共同实现商业成果的达成。

Match-making is designed to provide a unique platform for domestic and international exhibitors and buyers to communicate and cooperate. By planning and arranging the on-site Match-Making Meeting schedule, the organizer will enable exhibitors and buyers to realize precise matchmaking, exchange cooperation intentions and jointly achieve business results.

水舞台
AQUASTAGE

AquaStage 水舞台以“科技·创新·未来”为宗旨，围绕水行业搭建国际交流合作平台，为企业提供展示最新科技技术和前沿话题的舞台。AquaStage 水舞台这里不仅提供新品展示，更是一个汇聚创新思想、交流经验的盛会。观众可以深入了解行业的最新趋势，同时也能收获最先进的水处理技术，并与全球水行业的领军企业面对面共话未来。

AquaStage, focused on Technology, Innovation and Future, provides a platform for showcasing new technologies and industry developments. The forum features product demonstrations and knowledge exchange, allowing visitors to explore industry trends and connect directly with leading enterprises.

探索主题世界涵盖4大领域

CONTAIN+

净水世界
Clean Water World

水处理再循环世界
Waste Water & Resources World

数字化世界
Digital World

工业&商用水世界
Industrial & Corporate Water World

同期论坛 AQUA FORUMS

健康水家电 Healthy water appliances	**第二届环境与健康家电创新论坛** The 2nd Environment and Health Appliance Innovation Forum
饮用水健康 Drinking water health	**净水新趋势·健康饮用水创新论坛** New Trends in Water Purification and Healthy Drinking Water Innovation Forum
市政供排水 Municipal water supply and drainage	**2025供排水绿色低碳节能技术与应用研讨会** 2025 Seminar on Green, Low-carbon and Energy-saving Technology and Application for Water Supply and Drainage
膜及海水淡化 Membrane and seawater desalination	**2025海水淡化及膜技术创新与应用研讨会** 2025 Seawater Desalination and Membrane Technology Innovation and Application Seminar
化工水环境 Chemical water environment	**第二届化工行业水环境综合管理及化工企业水污染治理技术创新发展论坛** The 2nd Chemical Industry Water Environment Comprehensive Management and Chemical Enterprise Water Pollution Control Technology Innovation and Development Forum
水与污水处理 Water and Wastewater Treatment	**中荷水技术交流大会** China-Netherlands Water Technology Exchange Conference

*以上活动以现场为准

AQUATECH 品牌系列水展

专注水行业 覆盖全领域

TOGETHER WE MAKE WATER WORK

Aquatech China 2025
亚洲水技术展览会

荷兰阿姆斯特丹国际水处理展览会·中国展

2025.11.5-7 | 上海新国际博览中心

Aquatech China 2025
- TAP特邀买家·全球商贸对接

关键词：降本增效·赋能供应链·预见未来

目　的：为净水&水与水处理行业买家（终端用户、工程商、经销商等）提供资源及供应链对接、技术评估、及趋势洞察的一站式平台

[扫码加入TAP]

什么是TAP特邀买家?

TAP（Target Attendee Program）特邀买家是指前来参观Aquatech China亚洲水技术展览会的具有明确采购意向或采购计划的行业内高层或专业人士。我们专门成立TAP特邀买家俱乐部，为您打造一个更富成效和精准的商业平台。

在这儿，您可以第一时间与心仪的优质供应商面对面地沟通与交流、尊享特邀买家各种高端服务、获取前沿的行业资讯，为您结识新伙伴、开拓新市场和人脉打下基础，致力于帮助企业优化供应链，赋能采购资源，真正做到降本增效的效果。

为了提升您的观展效率，强化商务对接效果，Aquatech China正式启动TAP特邀买家计划，致力于为业界带来更多的合作机遇。

TAP特邀买家6大权益

快速绿色通道

专属特邀买家胸卡，快速确认您的贵宾身份；
享有专属绿色通道入场，节省您的宝贵时间；

专属1V1量身定制

实际了解采购需求，为您精准匹配感兴趣的优质供应商，提高参观效率；
深度体验业务场景，了解采购过程的痛点并协助优化解决方案；

展商信息抢先看

通过官方公众号及电子快讯，提前预览展商新品及介绍；
抢先了解行业资讯，最新动态及趋势；

让逛展变得更轻松高效

前制定观展路线；
提前了解亮点活动&商贸配对&同期论坛，且免费参与；

国际母展专属加持

实现从本土优质采购到全球化资源整合的价值升级；
联动母展Aquatech Amsterdam资源，提供双通道服务；

观展专属礼遇

专属特邀买家休息室，并享用专用茶点及无线网络服务；
获取商务礼包一套（含：展会会刊、参观指南、活动日程、餐票）；
精美定制礼品一份。

如何成为TAP买家?

如果您是来自以下群体的，且具有采购意向的，并能提供实际采购需求的核心决策部门、管理层以及技术、研发、设计等领域的专家，即可“码”上联系我们，需经资料审核无误后，方可加入！

Stephen Jin
18501676870
Stephen.j@aquatechexpo.com

终端用户：

市政单位（如自来水公司、污水处理厂、环保局）
工业领域（食品饮料、制药、电子、化工、电力等对水质要求高的行业）
商业领域（酒店、医院、学校、写字楼等需集中供水系统的机构）

解决方案提供商：

环保工程公司、水务工程承包商
系统集成商、OEM制造商（如净水设备生产商）

贸易渠道：

净水设备经销商、代理商、批发商
跨境电商（专注环保或家居净水产品）

企业规模：

中大型企业（年采购预算较高，决策链明确）
初创或成长型公司（可能需定制化解决方案）

业务需求：

涉及水处理设备采购（如反渗透设备、超滤系统、软化设备）
关注废水处理、中水回用、水质监测等技术
有更换或升级现有设备的计划（可通过招标或询价识别）

AQUATECH CHINA 2025 亚洲水技术展览会
荷兰阿姆斯特丹国际水处理展览会·中国展

About Us 关于我们:

Aquatech China 2025 亚洲水技术展览会将于 2025 年 11 月 5-7 日在上海新国际博览中心隆重举行！展会将由荷兰 RAI 锐昂展览集团、锐昂展览（上海）有限公司和北京国际展览中心有限公司主办。
Aquatech China 2025 will be held from 5 to 7 November 2025 at the Shanghai New International Expo Centre, organized by RAI China and Beijing International Exhibition Centre Co., Ltd.

作为一个完全专注于水领域的专业展会，Aquatech China 覆盖水处理全产业链，包含净水、水与污水处理、给排水管网及泵管阀、过程控制与自动化管理等领域进行全方位展示。同时还将对水的可持续发展、水处理数字化解决方案、水资源管理、水生态修复、膜技术发展、超净水、海水淡化、城市用水、工业水零排放、气候变化等多个话题进行深入的交流与探讨。
Aquatech is all about water and solely about water: it is Aquatech' s firm belief that the complexity of the challenges surrounding water and the environmental impact requires full focus worldwide. The programme includes water/wastewater treatment, infrastructure: transport & storage, process control，software & automation, point of use / point of entry and other areas for comprehensive display. There will also be in-depth exchanges and discussions on various topics such as sustainable water development, digital solutions for water treatment, water resources management, water ecological restoration, membrane technology devel opment, ultra-pure water, desalination, urban water, zero industrial water discharge and climate change as related to water.

Contact Us 联系我们:

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网址 Web：www.aquatechexpo.com

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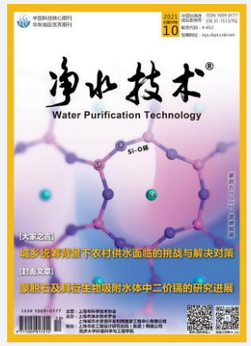
< 观众登记 >

SHANGHAI WATER PURIFICATION TECHNOLOGY PERIODICAL PRESS
上海《净水技术》杂志社

About Us 关于我们:

上海《净水技术》杂志社（www.jsjs1982.com）成立于 2001 年，是一家现代化咨询服务机构，业务以《净水技术》期刊为核心，结合行业需求和自身优势，衍生发展出学术出版、市场服务、情报咨询、水务科普、专业培训等多个业务板块。《净水技术》融媒体发展，与"净水技术"、"净水万事屋"和"水悟堂"等新媒体账号形成全媒体矩阵，覆盖面广、信息量大、表现形式丰富，具有良好的行业美誉度。

Welcome To Subscribe 欢迎订阅:



《净水技术》为月刊，被中国科技核心期刊等多个数据库收录，报道领域涉及市政给排水、工业水处理和水环境领域中的新技术与工艺、新材料与设备、新检测方法、创新管理技术及典型工程应用，适读对象包括国内外水务行业相关政府、高校、研究院、设计院、运营单位、工程公司和设备厂商等。

<订阅二维码>

《对标国际·供水实践进展》是通过对国外文献的学习阅读、精心筛选、专业译制并分类汇编的实用国外文献资讯合集，每月编制一册，内容包括国际供水行业知名团体或机构发布的最新运行实践经验总结、新技术或新设备的应用经验和精选自水行业权威期刊的最新科研动态原创论文等。

<订阅二维码>