内部资料

2024年第5期（总5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（Aguatech Amsterdam）至今已有近55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。

DUTCH GOVERNMENT'S PLAN TO SAVE DRINKING WATER INCLUDES GREYWATER RECYCLING
荷兰政府的饮用水节约计划包括灰水回用

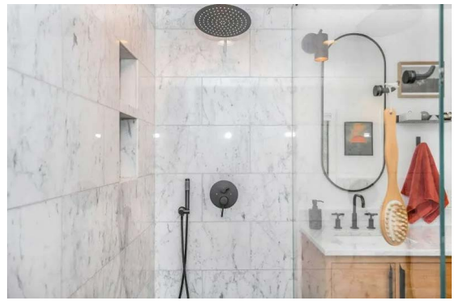
The Dutch government has set out plans to conserve drinking water that include asking households and business to reduce consumption and greywater recycling.
荷兰政府已经制定了节约饮用水计划，其中包括要求家庭和企业减少用水和进行灰水回用。

Drinking Water policies
饮用水政策

In 2012, the Dutch government adopted the Drinking Water Policy Paper 2021-2026. The policy's main objective is to 'provide sufficient drinking water of good quality for everyone in the European and Caribbean Netherlands, now and in the future'.
2012年，荷兰政府通过了《2021-2026年饮用水政策文件》。这项政策的主要目标是"为欧洲和荷兰加勒比区的每一个人提供足够的优质饮用水，既满足现在又面向未来"。

The policy was further adapted in May 2022, through the Implementation and Implementation Agenda (IenU agenda), which stated that 'the central government will develop an approach for economical and conscious drinking water use together with local authorities, drinking water companies and stakeholders'.
该政策于2022年5月通过实施和实施议程(IenU议程)进一步调整，该议程指出，"中央政府将与地方当局、饮用水公司和利益相关者共同制定经济和有意识地使用饮用水的方法"。

However, a combination of periods of drought and bottlenecks in capacity expansion by drinking water companies has led to growing media attention and put the future availability of drinking water on the agenda.
然而，由于干旱期和饮用水公司产能扩张的瓶颈相结合，媒体的关注日益增多，使饮用水的未来供应提上了议程。



A growing population and increasing demand
不断增长的人口和日益增加的需求

The government expects total drinking water demand to be higher in 2030 than 2020 (the year the original policy was being drafted). This equates to an additional demand on production capacity of 100 million m3 annually. Drinking water per capita has increased and population growth means an additional 900,000 new homes will be needed by 2030, all of which require drinking water connections.
政府预计，到2030年，饮用水的总需求将高于2020年（原政策草拟的年份）。这相当于每年额外需要1亿立方米的生产能力。人均饮用水增加，人口增长意味着到2030年需要额外的90万套新住房，所有这些都需要饮用水连接。

There is a need to find more drinking water at a time when climate change is reducing the amount of clean water available. Additional sources are needed as competition continues to grow between drinking water needs, industry, agriculture and nature.
在气候变化导致可用清洁水量减少的情况下，有必要找到更多的饮用水。随着饮用水需求、工业、农业和自然之间的竞争持续加剧，需要额外的水源。

National Plan of Action to Save Drinking Water
国家饮用水节约行动计划

The National Plan of Action to Save Drinking Water (NPvA) attempts to deliver the objectives of the 2021-26 plan, while meeting the expected 2030 demands. It sets out a national plan for reducing drinking water usage,including changing consumer behaviours,valuing water,retention, storage, and recovery.
《国家饮用水节约行动计划》（NPvA）旨在实现2021-2026年的计划目标，并满足2030年的预期需求。该计划提出了减少饮用水使用的国家计划，包括改变消费者行为、重视水资源、储存、存储和回用。

The Plan will work in tandem with an action programme for securing and increasing the availability of drinking water that will be a joint project between Vewin, the Interprovincial Consultation, and the Ministry of Infrastructure and Water Management - Action Programme for the Availability of Drinking Water Sources 2023-2030.
该计划将与一项保障和增加饮用水供应的行动计划并行，这将是Vewin、省际协商和基础设施与水资源管理部之间的一个联合项目——《2023-2030年饮用水源可用性行动计划。

What the plan sets out to achieve
该计划设定的目标

The plan sets out the following targets:
该计划设定了以下目标：

- Working towards a per capita drinking water consumption of 100 litres by 2035 (currently 125 litres) and limiting low-grade use of drinking water.
- 到2035年，努力达到人均饮用水用量为100升（目前为125升），并限制饮用水的低价值使用。

• Asking large-scale consumers to reduce drinking water consumption by 20 per cent to limit the effect of an increase in water demand in relation to the scarcer availability of water.
• 要求大型消费者将饮用水用量减少20%，以限制水需求增加对可用水日益稀缺的影响。

• By 2035, water-conscious construction will have proven itself and will have become the standard for new construction and renovation, so that drinking water consumption per capita will have fallen to an average of 100 litres per day.
• 到2035年，节水建筑将被证明其有效性，并成为新建和翻新工程的标准，以使人均饮用水用量降至每天100升的平均水平。

• Low-value use of drinking water will be restricted, both by business users and by households, in a strive for 'right quality for the right use'.
• 在追求"正确使用适用水质"的过程中，将限制企业用户和家庭的饮用水低价值使用。

The plan highlights the need for cooperation between the national government, provinces, municipalities and water boards, private and business consumers, drinking water companies, the construction and installation sector, and service providers such as housing corporations, and as such representatives of all were involved in drafting the plan.
该计划强调了国家政府、省、市和水务管理机构以及私人和商业消费者、饮用水公司、建筑和安装行业及住房公司等服务供应商之间的合作需要，因此所有这些部门的代表都参与了计划的草拟。

It also acknowledges that there will be further iterations of the plan as the current implementation is monitored and assessed.
该计划还承认，在监测和评估当前实施过程中，计划将有进一步的修订。

The plan states: "We initiate a longer-term movement/process and remain adaptive to new insights and developments. Saving drinking water is a long-term process. Adjustments in attitudes and habits, adjustments in laws and regulations, gathering the necessary knowledge and implementation of the consequences are not done in a few years. This means that we enter into a long-term commitment to each other and that we have to keep the plan dynamic. This is the only way we can make the results of the plan more and more SMART and achieve the goal at the end."
该计划指出："我们启动了一个长期的运动/过程，并对新见解和发展保持适应性。节约饮用水是一个长期过程，态度和习惯的调整、法律和法规的调整、必要知识的收集和实施后果不是几年内能完成的，这意味着我们之间要作出长期的承诺，并且必须保持计划的动态性。这是我们使计划结果越来越SMART，并在最后实现目标的唯一途径。"

How will savings be made?
如何节省用水?

Households
家庭

Households were responsible for 74 per cent of drinking water consumption in the Netherlands in 2020, with consumption per capita increasing annually. The 2016 report, Conscious and economical use of drinking water: Exploration of an effective set of instruments, states that the biggest household usage of drinking water was the shower (41 per cent) followed by toilet flushing (29), and the washing machine (18), the remaining percentages taken up by washing dishes, bathing and food preparation.
在2020年，家庭占荷兰饮用水用量的74%，人均用水量逐年增加。2016年的报告《有意识和经济地使用饮用水:有效工具组合的探讨》中指出，家庭饮用水使用量最大的是淋浴（41%），其次是冲厕所（29%）和洗衣机（18%），剩余的比例则用于洗碗、洗漱和做饭。

Efforts to save water in households, therefore, will focus on the biggest usage points. The plan identifies behavioural change, such as taking shorter showers, as the key to water savings, and efforts to develop key messaging and better communication, as well as researching barriers to change, are proposed for 2024-25 and beyond. Piloting the use of smart meters for water, to highlight to households how they use water is also under review.
因此，在家庭中节约用水的努力将集中在最大的使用点上。该计划指出行为改变，例如缩短淋浴时间，是节水的关键，同时提议从2024年至2025年及以后致力于逐渐形成关键信息和更好的沟通，并研究改变的障碍。此外，进行智能水表的试点研究，以向家庭强调他们的用水情况也正在进行审查。

New construction and renovation
新建筑和翻新

The plan stats that by 2035 water-conscious construction will have become the standard for new construction and renovation. Vacuum sewerage, the use of domestic water and greywater networks and the large-scale collection and application of rainwater are all identified as promising measures saving drinking water and reducing consumption. Although these measures are cheaper and easier to implement in new build homes, the plan considers the same measures to be conceivable for renovations on existing homes.
该计划指出，到2035年，节水建筑将成为新建筑和翻新的标准。真空污水处理、使用生活水和灰水网络以及大规模收集和应用雨水都被确定为节约饮用水和减少用量的有效措施。虽然这些措施在新建住宅中更便宜、更易于实施，但该计划认为这些措施在现有住宅的翻新中也是可行的。

If applied during construction, rainwater and greywater systems could provide drinking water savings of 30 to 48 litres per person, per day, per system, at a cost of €4,000 to €7,000 per system, according to a joint study between Ministry of the Interior and Kingdom Relations, in collaboration with the Ministry of Infrastructure and Water Management.
根据内政和王国关系部与基础设施和水务管理部的一项联合研究显示，如果在建筑过程中应用雨水和灰水系统，每个系统每人每天可节省30到48升的饮用水，成本为4000至7000欧元。

Further research will be conducted on rain and greywater systems. Also under consideration is

the definition of household water, and whether it can be expanded. As the plan explains: 'Currently, rainwater from the roof and groundwater are allowed as sources of household water for toilet flushing only. Based on the idea of striving for more opportunities for drinking water savings, circular water use and the right water for the right use within the household in the short term, it will be investigated whether bathing and shower water can be added as a source of domestic water without negative effects on public health.'
将对雨水和灰水系统进行进一步研究，同时也在考虑家庭用水的定义以及是否可以扩展。正如该计划所解释的："目前，来自屋顶的雨水和地下水仅被允许作为冲厕所的家庭用水源，基于争取更多饮用水节约机会的想法，短期内倡导循环用水和合理用水，将调查洗浴水和淋浴水是否可以作为家庭用水来源，而不会对公共健康产生负面影响。"

Business users
企业用户

The plan notes that business users are diverse, ranging from large industry to small office buildings. As such, solutions for saving drinking water will also need to be diverse. With this in mind, the Ministry of Infrastructure and Water Management and the Ministry of Economic Affairs and Climate Policy, will draw up benchmarks for various sectors (average and best water footprint per product) to serve as a target values.
该计划指出，企业用户的类型多种多样，从大型工业到小型办公楼，因此，节约饮用水的解决方案也需要多样化。考虑到这一点，基础设施和水务管理部以及经济事务和气候政策部将为各个行业制定基准（每种产品的平均和最佳水足迹）作为目标值。

Consideration will be given to whether the saving measures for new buildings and renovations can be implemented for business users.
将考虑新建和翻新工程的节水措施是否可以实施于企业用户。

The plan acknowledges the need to work cooperatively with stakeholders
该计划承认需要与利益相关者进行合作。

Other measures that will need to be monitored include regional differences in terms of water availability and use, obligations for energy savings and how these might counteract water savings, e.g industries using steam power might be required to use less water, but then will need to source energy from elsewhere, which might not be available and might hinder energy saving goals. Once again, the plan acknowledges the need to work cooperatively with stakeholders.
需要监测的其他措施包括水的可用性和使用方面的区域差异、能源节约的义务以及这些义务可能对节约用水产生的影响，例如行业可能被要求使用更少的水，但会需要从另一个地方获取能源，这些能源可能无法获得，从而影响节能目标。该计划再次承认与利益相关者合作的必要性。

A number of measures are proposed, however, including research into the effects and effectiveness of pricing/taxation for the purpose of reducing the use/use of (drinking) mains, groundwater and surface water. Proposals also include using data science and smart metering (such as pressure sensors) to optimise the water drinking network, and to identify improvements within business.
然而，提出了一些措施，包括研究为减少（饮用）自来水、地下水和地表水使用而定价/税收的影响和有效性。提案还包括使用数据科学和智能计量（例如压力传感器）来优化饮用水网络，并识别企业中的改进之处。

GOOGLE: WATER STEWARDSHIP AND SUSTAINABILITY GOALS
谷歌：水资源管理和可持续发展目标

In its latest Environmental Report 2024, Google has recognised the need for improved water stewardship practices across its data centres, offices and supply chain. The report revealed that the growth of AI had led to a 17 per cent increase in its water footprint in 2023 compared to the previous year, driven largely by cooling demands of its data centres.
在其最新的《2024 年环境报告》中，谷歌认识到需要改善其数据中心、办公室和供应链中的水资源管理实践。报告显示，人工智能的发展导致其 2023 年的水足迹与前一年相比增加了 17%，这主要是由于其数据中心的冷却需求。

AI revolution driving Google water requirements
人工智能革命推动谷歌的水资源需求

The processing power needed to cope with the rise of AI products and services contributed to a 17 per cent increase in Google's water footprint in 2023 compared to the year before. The total volume of water needed to cool its date centres was 6.1 billion gallons – a rise matched by increased electricity use.
为了应对人工智能产品和服务的兴起所需的处理能力，谷歌在2023年的水足迹相比前一年增加了17%。冷却其数据中心所需的总水量为61亿加仑，这一增长与电力使用的增加相匹配。

The Environmental Report 2024 estimates that this is the same amount of water needed to irrigate 41 golf courses annually in the southwestern US.
《2024年环境报告》估计，这一水量相当于美国西南部每年灌溉41个高尔夫球场所需的水量。

Despite the increased water footprint, in its report, the company stats that it strives to 'build the world's most energy efficient computing infrastructure, supported by responsible water use practices and a commitment to minimizing waste'.
尽管水足迹增加，但在报告中，该公司表示，它努力"建立世界上最节能的计算基础设施，以负责任的用水实践和最大限度地减少浪费的承诺作为支持"。

As befits a tech giant, the company is also using its products and services to help water stewardship projects around the world. For example:
作为科技巨头，该公司也在利用其产品和服务来帮助全球的水资源管理项目。例如：

•Google partnered to develop the Freshwater Ecosystems Explorer, a free, easy-to-use geospatial platform that provides national, sub-national, and basin-level data on freshwater ecosystems.
• 谷歌合作开发了淡水生态系统探索者，这是一个免费的、易于使用的地理空间平台，提供全国、省级和流域级的淡水生态系统数据。

• In collaboration with OpenET, as well as government and academic research groups, the company supported the automation and scaling of evapotranspiration (ET) models to help improve water management.
• 与OpenET及政府和学术研究团体合作，该公司支持蒸散（ET）模型的自动化和规模化，以改善水资源管理。

• Global Water Watch, a new tool featuring near-real-time reservoir storage data, was supported by Google.org through its 2020 Google.org Impact Challenge on Climate.
• 全球水监测工具是一个具有近实时水库储水数据的新工具，目前已经得到了谷歌.org的支持，并通过了其2020年谷歌.org气候影响挑战项目。

How is Google tackling its water footprint?
谷歌如何应对其水足迹?

In 2023, the company introduced its water risk footprint which was designed to 'further identify climate conscious cooling solutions that consider carbon-free energy availability, watershed health and future water needs'.
在2023年，谷歌推出了其水风险足迹，旨在"进一步确定考虑无碳能源可用性、流域健康和未来水需求的气候意识冷却解决方案"。

In attempting to address water usage, not only in its data centres and offices, but also in surrounding areas, Google is mirroring the sustainable frameworks in place at fellow tech giants Microsoft and Apple.
为了解决数据中心和办公室以及周边地区的用水问题，谷歌正在效仿微软和苹果等科技巨头已有的可持续框架。

The Environment Report 2024 introduces its approach to sustainable practices and outlines targets to measure progress against. The report separates actions between Products and Operations, with water stewardship sitting under the latter section alongside three other environmental challenges: Net Zero; Circular economy, and Nature & Biodiversity.
《2024年环境报告》介绍了其可持续实践的方法，并概述了衡量进展的目标。报告将行动分为产品和运营，水资源管理属于后者，与其他三个环境挑战并列：净零排放，循环经济以及自然与生物多样性。

Headline statistics
统计数据

Despite the company's increased water footprint, the report highlights a number of water stewardship improvements.
尽管公司的水足迹增加，但报告突出了一些水资源管理的改善情况。

•Water stewardship projects replenished an estimated 1 billion gallons (approximately 3.9 billion litres) of water in 2023, which represents 18 per cent of its 2023 freshwater consumption.

• 水资源管理项目在2023年补充了大约10亿加仑（约39亿升）的水，这占其2023年淡水用水量的18%。

• This tripled the company's replenishment progress of 6 per cent achieved in 2022.
• 这个数字是该公司在2022年实现的6%的补充进展的三倍。

• There were 74 water stewardship projects in 2023 across 46 watersheds, almost double the 38 projects operating in 2022.
• 2023年在46个流域中有74个水资源管理项目，几乎是2022年38个项目的两倍。

• Currently, 69 per cent of freshwater withdrawals came from watersheds with low water scarcity, 16 per cent came from watersheds with medium water scarcity, and 15 per cent came from watersheds with high water scarcity.
• 目前，69%的淡水取用来自缺水程度低的流域，16%来自缺水程度中等的流域，15%来自缺水程度高的流域。

The company has set a bold target of replenishing 120 per cent of the freshwater volume that it consumes 'on average, across our offices and data centres by 2030, and help restore and improve the quality of water and health of ecosystems in the communities where we operate'.
该公司设定了一个大胆的目标，计划到2030年补充其在办公室和数据中心平均用水的120%的淡水量，并帮助恢复和改善其运营社区中的水质和生态系统健康。

By 2023 it had a long way to go to meet its ambitious targets, with the figure currently standing at 18 per cent. However, the company looks to be on the right road, receiving Water Efficiency Award from PUB, Singapore's National Water Agency, which recognizes the top water efficiency performers in their respective sectors.
到2023年，距离实现这些雄心勃勃的目标还有很长的路要走，目前的比例为18%。然而，该公司似乎走在了正确的道路上，获得了新加坡国家水务局PUB颁发的水效率奖，该奖项是为了表彰其在各自行业中水效率表现最好的企业。

Google's water stewardship standards
谷歌的水资源管理标准

The company's overarching aim is to 'replenish more water than we consume and help improve water quality and ecosystem health in the communities where we operate'. This includes working collaboratively with communities and suppliers to 'replenish our freshwater consumption and improve watershed health while supporting ecosystems and water-stressed communities'.
公司的总体目标是"补充比我们消耗更多的水，帮助改善我们运营社区的水质和生态系统健康"。这包括与社区和供应商合作，"补充我们的淡水消耗并改善流域健康，同时支持生态系统和缺水的社区"。

To do this, the company's water stewardship strategy promotes responsible water resource management across its offices, data centres, and supply chain. It also states its aim to share technology and tools that 'enable everyone to predict, prevent, and recover from water stress'.
为此，公司提出的水资源管理战略推动了在其办公室、数据中心和供应链中进行负责任的水资源管理。它还表示，它的目标是分享"使每个人都能够预测、预防和应对水资源紧张的技术和工具"。

With offices in nearly 60 countries, Google is developing responsible water use practices for every region to help manage its global environment footprint. This will include all forms of

water use, including cooking, cleaning, irrigation and cooling. New buildings will comply with sustainable design standards and leading third-party certifications, including water meters with automated leak detection being fitted. Outdate fixtures will be replaced by water-efficient alternatives.
谷歌在近60个国家设有办事处，正在为每个地区开发负责任的用水实践，以帮助管理其全球环境足迹。这将包括所有形式的用水，包括烹饪、清洁、灌溉和冷却。新建筑将遵循可持续设计标准和领先的第三方认证，包括安装带有自动漏水检测的水表。过时的设备将被水效率更高的替代品所取代。

Stewardship is already in evidence in many of the company's offices. For example, the Bay View office in Mountain View, California, has a treatment system designed to capture and reuse water on-site via stormwater retention ponds and constructed wetlands. A central plant treats stormwater gathered from retention ponds and wastewater collected from buildings, producing recycled water that can be used for cooling towers and irrigation.
公司的许多办公室已经显示出这种管理的成效。例如，加利福尼亚州山景城的湾景办公室有一个处理系统，旨在通过雨水滞留池和人工湿地现场收集和回用水。中央设施处理从滞留池收集的雨水和从建筑中收集的废水中产生可用于冷却塔和灌溉的再生水。

Stormwater capture and recycled water is also used for non-potable purposes at the Gradient Canopy building in Mountain View, California, and the YouTube offices in San Bruno, where municipal water use is expected to fall by 18 per cent.
在加州山景城的Gradient Canopy大楼和圣布鲁诺的YouTube办公室，雨水收集和再生水也被用于非饮用目的，预计那里市政用水将减少18%。

In the wider environment, the company partners with the Colorado River Indian Tribes (CRIT) and N-Drip in Arizona to fund conversion of flood irrigation to precision drip irrigation, and to support farmers to enable water-saving crop rotations, as well as partnering with the Quechan Tribe on a farmland initiative whose water savings will bolster efforts to improve water security in the Colorado River Basin. Other projects include stormwater basin partnerships, rainwater collection, supporting regenerative agriculture, lake restoration, forest management, improving wetland habitats, and more.
在更广泛的环境中，谷歌与科罗拉多河印第安部落（CRIT）和亚利桑那州的N-Drip合作，资助将漫灌溉转变为精准滴灌，并支持农民实现节水作物轮作，同时与Quechan部落合作开展一项农田项目，其节水效果将增强改善科罗拉多河流域水安全的努力。其他项目包括雨水池合作、雨水收集、支持再生农业、湖泊恢复、森林管理、改善湿地栖息地等。

Why are cooling centres vast consumers of water?
为什么冷却中心耗水巨大?

Water cooling is important for regulating temperature inside a data centre. Overheating servers break down, impacting the services a modern world relies upon. In its Environment Report 2024, Google states that 'cooling has been shown to help reduce energy water consumption and related carbon emissions when compared to air-based cooling. While it will take more time for electricity grids to decarbonize, we'll continue using water cooling to improve our energy efficiency in certain geographies'.
水冷却对于调节数据中心内部温度至关重要。过热的服务器会故障，影响现代社会对此依赖的服务。在其《2024年环境报告》中，谷歌表示，"与基于空气的冷却相比，水冷却被证明能帮助减少能源水的消费和相关的碳排放。虽然电力网脱碳需要更多时间，但我们将继续在某些地区使用水冷却，以提高我们的能效。"

So, water cooled data centres are here to stay, for a while at least. Google recognises that the trade-off has increased its water footprint and has made responsible water use and water replenishment at new sites a priority from the outset. It also states that water reuse practices are being accelerated across existing offices and data centres, and that it is 'tailoring site-specific solutions based on facility types, locations, and local water contexts. We also use non-potable sources and freshwater alternatives whenever feasible' – such as such as reclaimed wastewater, industrial water, seawater, or even air cooling.
因此，水冷却数据中心至少在可预见的未来仍将存在。谷歌认识到，这种折中增加了其水足迹，并在一开始就将新场所的负责任用水和水再补充作为优先事项。它还表示，正在加速现有办公室和数据中心的水再利用实践，而且"正在根据设施类型、位置和当地水资源状况量身定制特定地点的解决方案。在可行的情况下，我们还使用非饮用水源和淡水替代品，如再生废水、工业用水、海水甚至空气冷却。"

Risk assessments are then conducted every three to five years to determine how well the strategy is working, alongside annual enterprise-wide checks. The framework has informed recent data centre developments where air-cooling is being used as an alternative to water because 'the source watersheds didn't meet our responsible use threshold for water cooling'. These include sites at Mesa, Arizona, and Canelones, Uruguay, and join other centres, such as the one in Dublin, Ireland, that use air instead of water for cooling.
然后，每三到五年进行一次风险评估，以确定战略的有效性，并进行年度企业范围的检查。该框架为近期数据中心的发展提供了依据，其中空气冷却被作为水冷却的替代方案，因为"水源流域未达到我们的负责任使用标准"，其中包括位于亚利桑那州梅萨和乌拉圭的卡内洛内斯站点，以及其他一些使用空气而不是水进行冷却的中心，比如爱尔兰都柏林的中心。

Wider water strategies
更广泛的水资源战略

The Environment Report 2024 also highlights other water-based initiatives:
《2024年环境报告》还强调了其他与水有关的倡议：

Satellite data combined with machine learning is also used to help Global Fishing Watch monitor the ocean's ecosystems. Another ocean-based project, Tidal, was chosen as one of Time Magazine's Best Inventions of 2023, uses AI to monitor underwater ecosystems.

卫星数据与机器学习相结合，也被用于帮助全球渔业观察组织监测海洋生态系统。另一个基于海洋的项目"潮汐"被评选为《时代》杂志2023年的最佳发明之一，该项目利用人工智能监测水下生态系统。

Habitat restoration and flood control were both introduced near the company's Sunnyvale, California campus. The project restored 4.3 acres of aquatic, wetland, and riparian habitat, which will benefit local and migratory water birds.
在加利福尼亚州的阳光谷，公司在校园附近引入了栖息地恢复和防洪项目，该项目恢复了4.3英亩的水生、湿地和河岸栖息地，将惠及当地和迁徙的水鸟。

In Hamina, Finland, the company turned a disused paper mill into a data centre while repurposing the existing electrical substation. A seawater cooling tunnel is used to cool the data centre, reducing the need for other sources of water.
在芬兰哈米纳，公司将一座废弃的纸厂改建为数据中心，同时重新利用现有的电力变电站。该数据中心采用海水冷却隧道进行降温，从而减少对其他水源的需求。

A new campus being built at the site of the company's first data centre in The Dalles, Oregon, provides a good example of how Google is viewing water use across more than just its data centres or offices. An Aquifer Storage and Recovery (ASR) system will pump excess surface water during the 'rainy season' into an existing aquifer for treatment and use during drier months, which the company likens to an underground 'savings account'.
位于俄勒冈州达尔斯的谷歌首个数据中心所在地正在建设一个新校园，这提供了一个很好的例子，展示了谷歌如何看待超过其数据中心或办公室的水使用。一个含水层储存和回用（ASR）系统将在"雨季"期间将多余的地表水泵入现有的含水层中，以便在干旱季节进行处理和使用，该公司将其比作地下的"储蓄账户"。

This surplus water would normally become unusable run-off but will now become a vital source of water in the drier summer months, reducing the need to use freshwater and groundwater from local streams and rivers.
这些多余的水通常会变成无法利用的径流，但现在将在干燥的夏季月份成为重要的水源，从而减少对当地溪流和河流中淡水及地下水的使用需求。

Water risk assessment
水资源风险评估

Google carries out an annual water risk assessment based on a combination of available risk assessment tools, including WRI Aqueduct Water Risk Atlas 3.0 and WWF Water Risk Filter 6.0, and other metrics. The assessment looks at risks related to scarcity, flooding, water quality, sanitation and hygiene, reputation, and regulatory stressors, identifying opportunities to improve water stewardship strategies.
谷歌每年进行水资源风险评估，基于多种可用的风险评估工具，包括WRI 渡槽水风险地图3.0和WWF水风险过滤器6.0以及其他指标。评估涉及与水资源稀缺、洪水、水质、环境卫生和个人卫生、声誉以及监管压力相关的风险，并识别改进水资源管理战略的机会。

In 2023, a water risk assessment was introduced for the company's data centres. This evaluates the health of the local water community's watershed and the impact of using locally available water for cooling. The data-driven analysis can also be used when choosing new sites for data centres and identifying potential ongoing risks.
2023年，公司为其数据中心引入了水风险评估。该项目评估了当地水社区流域的健康状况以及使用当地可用水进行冷却的影响。基于数据的分析也可以在选择新数据中心位置和识别潜在的持续风险时使用。

Risk is also assessed in the supply chain using WRI's Aqueduct Water Risk Atlas, WWF's Water Risk Filter, and WULCA AWARE. The key risks identified include baseline water stress, flood risk, access to safe drinking water, and the level of sanitation and hygiene services. Regular audits are conducted at supplier sites to ensure compliance with the company's code of conduct.
在供应链中也会使用WRI的渡槽水风险地图、WWF的水风险过滤器和WULCA AWARE进行风险评估。识别出的主要风险包括基本水资源压力、洪水风险、安全饮用水获取以及环境卫生和个人卫生服务水平。公司定期对供应商场所进行审核，以确保其遵守公司的行为准则。

Alternative sources of water
替代水源

Reclaimed water made up 22 per cent of Google's data centre cooling volume in 2023. For example, reclaimed water was used at data centres in Singapore and in Douglas County, Georgia, which avoided the wastewater from being discharged into the local Chattahoochee River.
2023年，回用水占谷歌数据中心冷却用水总量的22%。例如，在新加坡和佐治亚州道格拉斯县的数据中心使用了回用水，从而避免了废水排入当地的查塔胡奇河。

Other data centres in St. Ghislain, Belgium, Changhua County, Taiwan, and Eemshaven, Netherlands, use industrial water.
位于比利时圣吉斯兰、台湾彰化县和荷兰埃姆沙文的其他数据中心则使用工业用水。

AQUA
TECHNOLOGY

LATEST SERIES FUNDING SHOWS CONTINUED APPETITE FOR NEW MEMBRANE TECHNOLOGY
最新融资轮次突显新型膜技术的持续需求

Recent series funding awards show that there is continued appetite among water investors for opportunities to fund the work of membrane technology companies. As well as seeking a financial return, many investors view membrane technology as one of the solutions to future water scarcity issues that will increasingly affect communities and industries around the world.
最近的系列融资奖励显示，水投资者对资助膜技术公司的机会仍然有持续的需求。除了寻求经济回报外，许多投资者将膜技术视为解决未来水资源短缺问题的方案之一，这些问题将越来越影响全球的社区和行业。

The United Nations predicts 2.2 billion people already lack access to safely manged drinking water services. By 2025, half of the world's population could be living in water stressed areas. Many industries already operate in water basin catchment areas experiencing significant water shortages. Freshwater sources are becoming strained as demand continues to grow.
联合国预测，已有 22 亿人无法获得安全管理的饮用水服务。到 2025 年，全球一半的人口可能生活在水资源紧张的地区。许多行业已经在遭受严重缺水的流域集水区开展业务。随着需求的持续增长，淡水资源正变得紧张。

As such, many companies are setting their own environmental and sustainability goals, which include water use, conservation and reuse, which means turning to non-conventional sources of water that need treatment to be fit for purpose. Membranes are at the heart of this treatment process, whether on an industrial scale, or on a household level.
因此，许多公司正在制定自己的环境和可持续发展目标，包括水的使用、保护和再利用，这意味着正在转向需要处理以符合用途的非传统水源。膜技术是这一处理过程的核心，无论是在工业规模还是家庭层面。

In this article, we look at three recent membrane company investments.
在本文中，我们将关注三项最近对膜公司的投资。

Active Membranes closes seed funding round
活性膜公司完成种子轮融资

California-based Active Membranes has closed its initial seed funding round with investments from Natural Ventures, Echo River Capital, and Pacifica Water Solutions, among others.
位于加利福尼亚的活性膜公司已完成其初始种子轮融资，投资者包括Natural Ventures、Echo River Capital和Pacifica Water Solutions等。

The company develops electrically-conducting membranes that are used in desalination plants. The company will use the investment to further corporate growth, develop and scale up technology, facilitate commercialisation, and green light a number of extended field pilot tests.
该公司开发了用于海水淡化厂的电导膜。公司将利用这笔投资进一步推动企业发展，开发和扩大技术规模，促进商业化，并启动多项扩展的现场试点测试。

Following closure of the round, Arian Edalat, Active Membranes' co-founder and CEO told media: "This round of funding enables us to further refine our revolutionary technology and accelerate its commercialisation. We greatly appreciate the confidence that our investors have placed in us, and also recognise that their experience brings a significant value to our company that goes far beyond the infusion of capital."
在融资轮结束后，活性膜公司的联合创始人兼首席执行官Arian Edalat对媒体表示："这一轮融资使我们能够进一步完善我们的革命性技术，加速其商业化。我们非常感谢投资者对我们的信任，同时也认识到他们的经验为我们的公司带来了超越资本注入的巨大价值。"

Natural Ventures, one of the lead investors in the round, cited the rising global demand for fresh water as a driver for investment. Operating partner, Dr Benjamin Tan, told media: "As the global demand for fresh water continues to rise, especially in regions heavily reliant on desalination, the need to reduce both the economic and environmental costs of this vital process becomes increasingly urgent."
作为本轮融资的主要投资者之一，Natural Ventures提到全球对淡水需求的上升是投资的驱动力。运营合伙人Dr. Benjamin Tan对媒体表示："随着全球对淡水需求的持续上升，尤其是在高度依赖海水淡化的地区，降低这一重要过程的经济和环境成本的需求变得愈加迫切。"

Tan then explained why the investment was important to Natural Ventures: "This investment underscores Natural Ventures' commitment to supporting innovative solutions that address critical challenges in water resource management and sustainability."
Tan随后解释了这项投资对Natural Ventures的重要性："这项投资强调了Natural Ventures支持创新解决方案以应对水资源管理和可持续性关键挑战的承诺。"

Another investor, Echo River Capital, praised the membrane technology. Manging director, Peter Yolles, said: "Active Membranes will be a leader in advancing desalination through its innovative smart membranes. Active's unique electrically conducting coating will reduce the costs of water desalination among the existing installed base of reverse osmosis plants around the world."
另一位投资者Echo River Capital称赞了膜技术。董事总经理Peter Yolles表示："活性膜公司将在通过其创新智能膜推动海水淡化方面成为领导者。其独特的电导涂层将降低全球现有反渗透厂的海水淡化成本。"

But added, that the investment also contributed

towards the company's own goals; Yolles added: "This will fulfil Echo River's mission of innovating decentralized water treatment and satisfy our contribution towards SDG 6 – fresh drinking water for all."
但他补充说，这项投资也有助于公司的自身目标；Yolles补充道："这将实现Echo River创新分散式水处理的使命，并实现我们对可持续发展目标6的贡献——为所有人提供安全饮用水。"

Active Membranes' technology utilises patented technology that incorporates 'tuneable electrical potential into a spiral wound desalination membrane module to make it actively resistant to scaling and fouling during the desalination process'.
活性膜公司的技术利用专利技术，将"可调电位整合到卷式海水淡化膜块中，使其在海水淡化过程中可以抵抗结垢和膜污染"。

The anti-scaling, anti-fouling properties, ensure that the membranes require minimal pre-treatment and minimal usage of chemicals and consumables. They can also operate at a higher recovery rate and simplify operation, resulting in a lower footprint, lower capital costs, and reduced operating costs. Scalability means that the technology is applicable to both large scale desalination plants and to point of entry potable water systems in domestic or office environments.
抗结垢、抗污染的特性可以确保膜需要最少的预处理和最少的化学品和消耗品使用。它们还可以在更高的回收率下运行，简化操作，从而降低占地面积、资本成本和运营成本。可扩展性意味着该技术适用于大型海水淡化厂和家庭或办公室环境中的进水饮用水系统。

ZwitterCo secures €54 million Series B Funding
ZwitterCo获得5400万欧元的B轮融资

Advanced membrane tech company ZwitterCo secured almost €54 million following an oversubscribed Series B Funding round. The investment, which was led by Evok Innovations, was also joined by DCVC, BHP, Munich Re Ventures, Siteground, HG Ventures, and Blue Horizon Advisors. ZwitterCo raised 33 million during its Series A funding in 2022.
先进膜技术公司ZwitterCo在一轮超额认购的B轮融资中成功获得近5400万欧元的资金。这轮融资由Evok Innovations领投，DCVC、BHP、Munich Re Ventures、Siteground、HG Ventures及Blue Horizon Advisors等公司也参与了投资。ZwitterCo在2022年的A轮融资中筹集了3300万欧元。

The funding will be used to 'unlock the potential' of unconventional water sources, such as industrial wastewaters and more challenging surface waters or process streams, to meet the massive water demands of industries that underpin a low-carbon future.
这笔资金将用于"释放"非常规水源的潜力，例如工业废水以及更具挑战性的地表水或工艺流，以满足支撑低碳未来的行业对水的大量需求。

ZwitterCo's tech breakthrough introduced 'membranes with novel zwitterionic chemistries', which create immunity to organic fouling, enabling the company's membranes to continue working efficiently and sustainably long after traditional ones might have become clogged.
ZwitterCo的技术突破引入了"具有新型两性离子化学特性的膜"，这些膜能够抵抗有机污染，使公司的膜在传统膜可能被堵塞后，仍然能够高效、可持续地工作。

ZwitterCo founder and CEO Alex Rappaport told media, following the closure: "Climate change is simultaneously driving water scarcity and increasing demand for water in industries critical to the low-carbon transition. This funding will allow us to rapidly scale our breakthrough membrane technology, empowering industries to reliably and affordably access unconventional water resources while ensuring the water used or recycled in these industries meets the highest purity standards."
ZwitterCo创始人兼首席执行官Alex Rappaport在融资结束后对媒体表示："气候变化同时导致水短缺和对关键低碳转型行业水的需求增加。这笔资金将使我们能够快速扩大我们的突破性膜技术，使行业能够可靠且经济地获取非常规水资源，同时确保这些行业使用或回收的水达到最高的纯度标准。"

Lead investor, Evok Innovations, invested in ZwitterCo because of its potential to solve energy problems. "The full spectrum of the energy transition – from power and next-gen fuels to mining and critical minerals – relies on clean water," Naynika Chaubey, partner at Evok Innovations told media. "The increasing unreliability of global water sources could put many of our energy systems at risk. ZwitterCo's breakthrough technology is critical and timely, making this investment a cornerstone of Evok's portfolio."
领投方Evok Innovations之所以投资ZwitterCo，是因为其在解决能源问题方面的潜力。Evok Innovations的合伙人Naynika Chaubey对媒体表示："能源转型的全方位——从电力和下一代燃料到采矿和关键矿物——都依赖于清洁的水。全球水源日益不可靠可能使我们的许多能源系统面临风险。ZwitterCo的突破性技术至关重要且及时，这使得这项投资成为Evok投资组合的基石。"

Another investor, DCVC, told media that it was ZwitterCo's potential for providing water resilience via its membrane technology that made it an attractive investment.
另一位投资者DCVC告诉媒体，ZwitterCo通过其膜技术提供水资源韧性的潜力使其成为一个有吸引力的投资对象。

Jason Pontin, general partner at DCVC and chairman of ZwitterCo's board of directors, said: "Long before the planet feels the worst of climate change, without new solutions and more efficient water markets, cities and farms around the globe will suffer severe water stress. Reusing unconventional water sources is the only way to achieve water resiliency, and ZwitterCo's groundbreaking membrane technology is the key deep tech breakthrough that makes water reuse practical and economical. Nothing is more important than the company's work to secure a sustainable water future."
DCVC的普通合伙人兼ZwitterCo董事会主席Jason Pontin说："在我们的星球感受到最严重的气候变化之前，如果没有新的解决方案和更高效的水市场，全球的城市和农场将遭受严重的水资源压力。重复利用非常规水源是实现水资源韧性的唯一方法，而ZwitterCo突破性的膜技术是使水资源再利用变得实用和经济的关键的深度科技突破。没有什么比公司为确保可持续的水未来而做的工作更重要。"

Membrion Series B funding brings total to €11.5 million
Membrion B轮融资总额达到1150万欧元

Not quite as recent as the two about, but Membrion's successful Series B funding round from last year offers good evidence that membrane technology companies continue to be attractive to investors.
虽然不如前两条消息那么新鲜，但Membrion去年的成功B轮融资为膜技术公司继续吸引投资者提供了良好的证据。

The Seattle-based company, which makes electro-ceramic desalination membranes, secured just over €5 million in the second round of Series B funding, led by Samsung Venture Investment Corporation and Lam Capital. These were joined by Indico Capital Partners, Harvard Business School New York Alumni Angel Group, New York Angels, and GiantLeap Capital.
这家总部位于西雅图的公司生产电陶瓷海水淡化膜，在第二轮B轮融资中获得了超过500万欧元的资金，融资由三星风险投资公司和Lam Capital领投。Indico Capital Partners、哈佛商学院纽约校友天使团、纽约天使投资人和GiantLeap Capital也参与了投资。

This followed quarter one investment of €6.5 million led by PureTerra Ventures, which was joined by GiantLeap Capital, Safar Partners, Freeflow Ventures, and others, bringing total Series B funding to €11.5 million, with just over €21 million raised since the company founded.
在此之前，PureTerra Ventures在第一季度获得了650万欧元的投资，GiantLea Capital、Safar Partners、freflow Ventures和其他公司也加入了该投资，使得B轮融资总额达到了1150万欧元，自公司成立以来共筹集超过2100万欧元。

Membrion's founder and CEO Greg Newbloom told media at the time: "I couldn't be more excited about the investment syndicate that we've built for this round. Our technology is a game changer for creating circularity of valuable resources from challenging wastewater, including harsh metal-laden wastewater in the semiconductor industry."
Membrion的创始人兼首席执行官Greg Newbloom当时对媒体表示："我对我们为这一轮融资所建立的投资团体感到无比兴奋。我们的技术改变了游戏规则，可以从具有挑战性的废水中创造有价值的资源循环，包括半导体行业中含有重金属的废水。"

Newbloom then explained the reasons for its successful funding round: "Membrion has had many successful pilot projects and now has multiple commercial installations coming on-line that will save each customer hundreds of thousands of dollars per year. We're thrilled to be one of the few sustainable wastewater treatment options that actually lowers facility operating costs – that's been a big key to our success so far."
Newbloom随后解释了其成功融资的原因："Membrion有许多成功的试点项目，现在有多个商业安装即将上线，这将为每个客户节省数十万美元的年度成本。我们很高兴成为少数能够实际降低设施运营成本的可持续废水处理选项之一——这一直是我们迄今为止成功的关键所在。"

Both lead investors in the second round indicated that Membrion's membranes were ideally suited to their specific needs.
第二轮的两位主要投资者表示，Membrion的膜技术非常适合他们的特定需求。

Kevin Chen, head of Lam Capital, said: "Membrion is paying careful attention to creating sustainable solutions for water and resource circularity. This strategic investment reflects Lam Capital's focus on investments in companies with the potential to have a disruptive force in technology and advance the semiconductor industry, and we believe Membrion may play an important role in ensuring that complex industrial wastewater is treated and reused sustainably while helping to meet ambitious ESG targets."
Lam Capital的负责人Kevin Chen表示："Membrion正在密切关注为水资源和资源循环创造可持续解决方案。这一战略投资反映了Lam Capital对具有颠覆性技术潜力公司的投资关注，并推动半导体行业的发展，我们相信Membrion可能在确保复杂工业废水得到可持续处理和再利用方面发挥重要作用，同时帮助实现雄心勃勃的ESG目标。"

A spokesperson for Samsung Ventures Investment Team, told media at the time: "We are excited about Membrion's approach to creating a new wastewater treatment solution for challenging industrial applications. By selectively removing salts, metals and minerals from wastewater, they are opening up opportunities for water recycling and resource recovery in microelectronics and other industries."
三星风险投资团队的一位发言人当时对媒体表示："我们对Membrion在为具有挑战性的工业应用创造新的废水处理解决方案方面的做法感到兴奋。通过选择性去除废水中的盐、金属和矿物质，他们正在为微电子和其他行业的水回收和资源回收开辟机会。"

Membrane technology meet both local and global needs
膜技术满足地方和全球需求

New membrane technologies may differ in approach and application, but they all share overriding goals of reducing costs and consumption, while improving water quality and making more water available without impacting groundwater.
新型膜技术在方法和应用上可能有所不同，但它们都有共同的目标，即降低成本和消耗、改善水质并在不影响地下水的情况下提供更多的水。

Whether the technology meets an investor's immediate local concerns or whether a membrane company's solution can help to meet global environmental targets associated with water, it is clear that water tech investors are on the lookout for opportunities to accelerate the availability of innovative membrane technologies.
无论技术是否满足投资者的即时地方需求，还是膜公司提供的解决方案能否帮助实现与水相关的全球环境目标，显然，水技术投资者都在寻找机会，以加速创新膜技术的可用性。

AQUA TECHNOLOGY

ESSENTIAL GUIDE: HOW AI IS USED IN THE WATER SECTOR
必备指南：人工智能在水行业中的应用

You might have heard a lot about AI (artificial intelligence) in the last couple of years. It is everywhere, it is the talk of industry events, it is the subject of office discussions, and the news is full of it.
您可能在过去几年中听到了很多关于人工智能(AI)的信息。它无处不在，是行业活动中的热门话题，是办公室讨论的内容，新闻中也充满了它的身影。

What exactly is AI?
什么是人工智能?

It has already become such a ubiquitous term, and promises so much, that it can sometimes be hard to imagine there is actual scientific and computer theory behind it.
这个词已经成为一个无处不在的术语，并带来了如此多的可能性，以至于有时很难想象它背后实际上有科学和计算机理论的支撑。

Essentially, as IBM succinctly states, artificial intelligence is 'technology that enables computers and machines to simulate human intelligence and problem-solving capabilities'. So, any computer program that mimics the human brain.
简而言之，正如IBM简洁陈述的那样，人工智能是“使计算机和机器能够模拟人类智能和问题解决能力的技术”。因此，任何模仿人脑的计算机程序都可以被视为人工智能。

The promises of AI are plentiful, but it is not a new technology. Machine learning and artificial neural networks (ANNs) have been used to 'listen' and analyse for decades. What we have now in abundance, as opposed to back in the 1990s and 2000s is faster computers and cloud-based storage and retrieval.
人工智能的前景十分广阔，但它并不是一项新技术。机器学习和人工神经网络（ANN）已经被用于“倾听”和分析了数十年。与1990年代和2000年代相比，我们现在拥有的是更快的计算机和基于云的存储与检索。

AI is already being used across all areas of the water sector, for example, Support Vector Machines (SVMs), used in wastewater treatment plants, which can classify and predict specific outcomes with high accuracy. The potential for future use can seem limitless.
人工智能已经在水行业的各个领域得到应用，例如，在污水处理厂中使用的支持向量机（SVM），它能够以高准确度分类和预测特定结果。在未来的应用潜力似乎是无限的。

In this feature, we will introduce some of the company's using AI in real-world applications which, by necessity, cannot be an exhaustive list.
在本篇中，我们将介绍一些在实际应用中使用人工智能的公司，当然，这个列表无法详尽列出。

Consumer predictions
消耗预测

Aquatech Online spoke to Jorge Helmbrecht, business development director at Idrica to understand more about AI and the water sector.
Aquatech Online采访了Idrica的业务发展总监霍尔赫·赫尔姆布雷希特（Jorge Helmbrecht），以了解更多关于人工智能和水行业的信息。

We asked Jorge, what the relationship is between AI and machine learning (two terms used often use interchangeably).
我们询问了霍尔赫人工智能与机器学习之间的关系，因为这两个术语常常可以互换使用。

He said: "AI is the combination of algorithms designed to enable a machine or computer system to perform processes that are attributable to human intelligence. These processes usually include solving complex problems that do not have a simple physical or mathematical model and require language understanding and machine learning.
他说：“人工智能是算法的组合，旨在使机器或计算机系统能够执行可归因于人类智能的过程。这些过程通常包括解决没有简单物理或数学模型的复杂问题，并需要语言理解和机器学习。

"Machine Learning is a form of AI that uses different techniques and algorithms such as pattern recognition of large amounts of data to draw valid conclusions and support decision making."
“机器学习是一种人工智能形式，它使用不同的技术和算法，如对大量数据的模式进行识别，以得出有效的结论并支持决策。”

In terms of using AI in the water sector, Jorge told Aquatech Online that there were a wide variety of applications.
谈到人工智能在水务领域的应用，霍尔赫告诉Aquatech Online，人工智能的应用范围很广。

"The recognition of consumption patterns, predictions, data validation, simulation of water system behavior, anomaly detection, etc. In particular, AI opens up many possibilities by using data-driven models, not only physical or mathematical models, that are very difficult to implement if not all system variables or boundary conditions are known."
“消耗模式的识别、预测、数据验证、水系统行为的模拟、异常检测等。特别是，人工智能通过使用数据驱动模型而不仅仅是物理或数学模型，打开了许

多可能性，这在不知道所有系统变量或边界条件的情况下是非常难以实现的。"

And the benefits are huge. Jorge listed just a few:
而且其好处是巨大的。霍尔赫列举了一些例子：

"AI helps us to make faster decisions using the full power of data, for example, optimising water resource management, making more reliable predictions of hydraulic variables, detecting anomalous consumption patterns - and with them detecting and reducing leaks in distribution networks, facilitating the detection of anomalies in monitoring, improving efficiency in wastewater treatment, etc."
"人工智能可以帮助我们利用数据的全部力量做出更快的决策，例如，优化水资源管理，更可靠地预测水力变量，检测异常消耗模式——通过这些检测和减少配水管网中的泄漏，促进监测中的异常检测，提高废水处理的效率等。"

Idrica uses AI in several application on its platform, to facilitate an efficient and sustainable operation for water utilities:
Idrica在其平台上使用人工智能进行了多项应用，以促进水务公司的高效和可持续运营：

• For consumption predictions that are used both in leak detection tools and in its digital twin to simulate future scenarios;
• 用于消耗预测，这些预测既用于泄漏检测工具，也用于其数字孪生以模拟未来情景；

• Various algorithms are used to detect patterns that allow Idrica to identify the consumer typology and whether the consumer matches the corresponding assigned customer;
• 使用各种算法检测模式，使Idrica能够识别消费者类型以及消费者是否与相应的指定客户匹配；

• Specific algorithms are used to improve treatment processes in plants (e.g. dosing) or to optimise the planning and management of sewage network inspection and maintenance tasks (CCTV Inspections);
• 使用特定算法改善工厂中的处理过程（例如加药）或优化污水管网检查和维护任务的规划和管理（CCTV检查）；

• In its Operational Intelligence module to provide users with data queries, reports and information on the management and operation of the water cycle.
• 在其运营智能模块中，为用户提供关于水循环管理和运营的数据查询、报告和信息。

But what does the future hold for AI and the water sector? For AI to continue to make an impact, data quality is paramount. What you put into the AI algorithm, you get out.
但人工智能和水行业的未来会怎样呢？为了让人工智能继续产生影响，数据质量至关重要。输入到人工智能算法中的数据决定了输出的结果。

Jorge believes the use of AI will be extended to the processing and validation of hydrological and hydraulic data, to hydro-meteorological forecasting systems, to the detection of behavioral patterns of very complex systems such as a complete drinking water distribution network or the processes involved in the treatment of a wastewater treatment plant.
霍尔赫认为，人工智能的应用将扩展到水文和水力数据的处理与验证，水文气象预报系统，检测非常复杂的系统的行为模式中，例如完整的饮用水配水管网或废水处理厂中涉及的处理过程。

He added: "Another important challenge where AI can collaborate is in water quality or pollution issues. Finally, AI support for automatic operation recommendations will be key, as well as for easier interaction at the human-machine interface using large language models."
他补充道："人工智能可以协助的另一个重要挑战是水质或污染问题。最后，人工智能对自动操作建议的支持将是关键，同时也能通过使用大型语言模型实现人机界面的更轻松互动。"

Keeping our sewers flowing
保持我们的下水道畅通

SewerAI uses computer visions tools to monitor and automatically detect different conditions caught on camera in sewer inspection videos. This data can be uploaded into a cloud-based AI system which can then be analysed, shared and acted upon using desktop software.
SewerAI使用计算机视觉工具监控并自动检测在下水道检查视频中捕捉到的不同条件。这些数据可以上传到基于云的人工智能系统中，然后通过桌面软件进行分析、共享和采取行动。

Eric Sullivan, director of business development, SewerAI, told Aquatech Online: "We currently uses AI in a descriptive way, rather than prescriptively. Our offering is a turnkey service, but we are considering customer-facing AI tools in future developments. We are also considering adding predictive AI to offer asset managers a tool that can support their planning and decision-making."
SewerAI的业务发展总监埃里克·沙利文（Eric Sullivan）在接受Aquatech Online采访时表示：

"我们目前以描述性方式使用AI，而不是指令性方式。我们的服务是一个交钥匙解决方案，但我们正在考虑未来开发面向客户的AI工具。我们还考虑增加预测性AI，以为资产管理者提供一个可以支持他们规划和决策的工具。"

He added: "Our approach is to improve our tools through hands-on projects, which has resulted in over 30,000 miles of pipe data being stored on our platform."
他补充道："我们的做法是通过实际项目来改进我们的工具，这使得我们在平台上存储了超过30,000英里的管道数据。"

The company's current client base is split three ways between utilities, contractors, and engineering firms.
该公司的现有客户群体分为三类：公用事业公司、承包商和工程公司。

SewerAI's technology is capable of detecting and reporting on either a single condition or a suite of them, depending on customer need. Customer results have showed improved efficiency in terms of costs and time, and compared to the traditional method, where a team would go out and make an inspection, a reduction in the potential for errors and burnout.
SewerAI的技术能够检测并报告单一条件或一组条件，具体取决于客户的需求。客户的结果显示在成本和时间方面的效率有所提高，并且与传统方法相比，传统方法需要一个团队外出检查，因此减少了错误和人力疲劳的潜在风险。

Eric added: "It simplifies workflow; allows operators to focus on filming the inside of the pipes and doesn't require them to be experts in assessment; there are cost and time savings in both the field and office review phases."
埃里克补充说："它简化了工作流程；使操作人员能够专注于拍摄管道内部，而不需要成为评估方面

的专家；在现场和办公室审查阶段都有成本和时间的节省。"

As always, the quality of the data used to train the AI is reflected on the accuracy of the product. At SewerAI, every image fed into the AI program is reviewed inhouse by qualified staff to ensure accuracy and consistency.
一如既往，用于训练AI的数据质量反映在产品的准确性上。在SewerAI，每张输入到AI程序中的图像都要经过合格员工的内部审核，以确保准确性和一致性。

Listening to plant anomalies
"倾听"工厂异常

Singapore-based Teredo Analytics is using AI to help remotely monitor pipework in wastewater treatment plant in Sarawk, Malaysia. Ambient listening devices are placed in the vicinity of pipes and are trained to recognise the sounds that indicate common faults. Utility operators would normally rely on manual inspections, which can be infrequent and subjective.
位于新加坡的Teredo Analytics正在利用AI来帮助远程监测位于马来西亚砂拉越的污水处理厂的管道。环境监听设备被安置在管道附近，并经过训练能够识别指示常见故障的声音。公用事业运营商通常依赖人工检查，但这种检查可能不够频繁且带有主观性。

The devices offer early detection of 'anomalies', through 24/7 monitoring, which alert operators via SMS alerts. This helps to eliminate costly and disruptive unplanned downtime and can reduce overall costs by allowing maintenance work to take place before a major problem occurs.
这些设备通过全天候的监控提供"异常"的早期检测，并通过短信提醒操作员。这有助于消除昂贵且具有破坏性的计划外停机，并通过允许在出现重大问题之前进行维护工作，从而降低整体成本。

Flood protection and prevention
防洪

Serbian company Vodena specialises in innovative software solutions for the water and energy sectors. It is developing VodostAI to harness both AI and the Internet of Things (IoT) to help tackle flooding in the western Balkans, which in 2023 caused 300 million Euros in damage and affected more than one million people. It has been developed by a team led by Boban Stojanović, PhD, that includes experts in AI, software development, and domain specialists with multi-year expertise in hydrology and environmental science, ensuring a robust and effective solution.
来自塞尔维亚的Vodena公司专注于水和能源领域的创新软件解决方案。它正在开发VodostAI，即利用人工智能和物联网（IoT）来帮助解决西巴尔干地区的洪水问题，该地区在2023年造成了3亿欧元的损失，并影响了超过一百万人。该项目由博士博班·斯托扬诺维奇（Boban Stojanović）领导的团队开发，团队成员包括在人工智能、软件开发及具有多年水文学和环境科学专业知识的领域专家，以确保解决方案的稳健性和有效性。

A company spokesperson told Aquatech online: "As with other weather-related natural phenomena, the frequency and intensity of floods have recently increased due to the effects of climate change, such as heavy rainfall in short periods or moderate rainfall over longer periods leading to river overflows. With the development of VodostAI, Vodena aims to mitigate the adverse impacts of floods, protect communities, and ensure sustainable management of water resources."
一位公司发言人在接受Aquatech Online采访时表示："与其他天气相关的自然现象一样，由于气候变化的影响，例如短时间内的强降雨或长时间的中等降雨导致河流溢出，最近洪水的频率和强度有所增加。通过VodostAI的开发，Vodena旨在减轻洪水的负面影响，保护社区，并确保水资源的可持续管理。"

Vodena automates the collection of data via integrated intelligent sensors that is processed using advanced machine learning algorithms to create predictive models. By collecting and processing hydrometeorological data Vodena can forecast water levels and issue timely warnings.
Vodena通过集成智能传感器自动收集数据，并使用先进的机器学习算法进行处理，以创建预测模型。通过收集和处理水文气象数据，Vodena能够预测水位并发出及时警报。

The AI component was developed using Vodena's proprietary Blackfox platform -www.blackfox.ai – which utilises deep neural networks enhanced with genetic algorithms for optimization purposes. The platform continuously monitors and updates the models using new data to ensure accuracy and relevance.
AI组件是利用Vodena的专有平台Blackfox（www.blackfox.ai）开发的，该平台利用深度神经网络，并结合遗传算法进行优化。该平台通过使用新数据持续监控和更新模型，以确保准确性和相关性。

Additionally, Physics-Informed Neural Networks (PINNs) are employed to train models even with

limited data by incorporating known physical laws, further enhancing the system's predictive capabilities.
此外，物理信息神经网络（PINNs）被用来通过结合已知的物理法则来训练模型，即使在数据有限的情况下，也能进一步增强系统的预测能力。

A spokesperson added: "The VodostAI project is currently in the preparation phase, with plans for its real-world application to be demonstrated in the Velika Morava River basin. During this phase, data will be collected from existing monitoring systems and newly installed IoT devices to enhance data accuracy and model predictions."
发言人补充道："VodostAI项目目前处于准备阶段，计划在Velika Morava河流域进行实际应用。在此阶段，将从现有的监测系统和新安装的物联网设备中收集数据，以提高数据的准确性和模型的预测能力。"

They added: "The project will include the installation of number of IoT devices, strategically placed to improve monitoring and prediction capabilities. Over the next 12 months, the system's performance will be validated against historical hydrological events and existing physical models, ensuring its reliability."
他们还表示："该项目将包括安装多个物联网设备，战略性地布置以改善监测和预测能力。在接下来的12个月中，系统的性能将与历史水文事件和现有物理模型进行验证，以确保其可靠性。"

These are just a few of the many companies using AI in the water sector and just a few of the applications. You can see that AI spans the entire industry. The potential for future use is vast, but success will always depend on the quality and consistency of data being fed into the algorithms. Humans will still be needed to check for accuracy, of course.
这些只是许多在水行业中使用AI的公司的一部分例子以及一些应用。可以看到，AI覆盖了整个行业，并且未来使用的潜力巨大，但成功始终取决于输入算法的数据质量和一致性。当然，人类仍然需要检查其准确性。

AI applications certainly lend themselves well to monitoring and detection, anywhere where patterns of normal behaviour can be mapped, data logged and analysed.
AI应用确实非常适合监测和检测，尤其是在可以映射正常行为模式、记录和分析数据的地方。

US ELECTIONS: WHAT THE WATER INDUSTRY CAN EXPECT
美国大选：水行业的未来展望

Bluefield Research has released a report examining what the outcome of the US presidential elections would mean for the country's water industry.
Bluefield Research 发布了一份报告，探讨了美国总统选举的结果对该国水行业的意义。

Why the race to the White House matters
为什么竞选很重要

In the report, Reese Tisdale, president and CEO, Bluefield Research, said that the water industry was at a crucial juncture, and that whoever heads to the White House in November, faced many challenges from ageing infrastructure to climate-related risks.
在报告中，Bluefield Research总裁兼首席执行官里斯·提斯代尔表示，水行业正处于关键时刻，无论谁在11月进入白宫，都面临着从老化基础设施到气候相关风险的诸多挑战。

He added that the analysis was in "response to a flurry of inquiries from Bluefield clients seeking to understand the impact of upcoming elections and potential effects on the policy landscape, infrastructure investments, supply chains, water quality management, and legal ramifications for municipal and industrial water and wastewater operators."
他补充说，这项分析是"回应Bluefield 客户的一系列询问，这些客户希望了解即将到来的选举及其对政策环境、基础设施投资、供应链、水质管理以及市政和工业水及废水运营商的法律影响的潜在影响。"

The research paper specifically examines what impact each party might have should they win the election, in terms of impact on municipal utility service providers and industrial water and wastewater sectors. Of course, legislation and long-term policy planning will all be affected by the final make-up of the Senate and the House of Representatives, and whether either party exerts control.
研究报告特别考察了如果每个政党赢得选举，将对市政公用事业服务提供商和工业水及废水领域可能产生的影响。当

然，立法和长期政策规划都将受到参议院和众议院最终组成以及两个政党是否会控制这两个机构的影响。

A Kamala Harris-led Democratic win
由卡玛拉·哈里斯领导的民主党获胜

Being the incumbent party, the Democrats are likely to continue with many of their existent policies. The authors of the report suggest 'incremental change'. Whether the withdrawal of President Biden from the election race, with Vice-President Kamala Harris now the party's candidate, will result in a change of policy or funding is unclear.
作为执政党，民主党可能会继续实施许多现有政策。该报告的作者建议采取"渐进式变化"。拜登总统退出竞选，现任副总统卡玛拉·哈里斯成为该党的候选人，这是否会导致政策或资金的变化尚不明朗。

Under President Biden's administration, €57.7 billion from the Infrastructure Investment & Jobs Act (IIJA) was directed to clean and drinking water initiatives, including tackling Per- and poly-fluoroalkyl substances (PFAS), State Revolving Funds (SRFs), the Water Infrastructure Finance and Innovation Act (WIFIA), Water Infrastructure Improvements for the Nation (WIIN) Act, and more.
在拜登总统的执政期间，来自《基础设施投资与就业法案》（IIJA）的577亿欧元被用于清洁和饮用水倡议，包括应对全氟和多氟烷基物质（PFAS）、州循环基金（SRFs）、水基础设施融资与创新法案（WIFIA）、国家水基础设施改善法案（WIIN）等。

The IIJA allocates roughly €6.8 billion for Water Infrastructure for the Nation, Water Recycling and Desalination, Water Storage and Conveyance, and WaterSMART Grants. The report suggests that the IIJA is likely to survive regardless of which party wins the election, as both are committed to infrastructure projects.
IIJA拨款约68亿欧元用于国家水基础设施、水回收与海水淡化、水储存与输送以及WaterSMART赠款。报告指出，无论哪一党赢得选举，IIJA很可能会继续存在，因为两个政党都致力于基础设施项目。

Other acts that impact on water and wastewater management include the Inflation Reduction Act (hydrogen, water for metal mining), the US Chips and Science Act (semiconductor fabrication water and wastewater treatment requirements), and more.
影响水和废水管理的其他法案包括《通货膨胀减少法案》（涉及氢和金属采矿用水）、《美国芯片与科技法案》（涉及半导体制造的水和废水处理要求）等。

The report speculates that future policy might include further PFAS enforcement and effluent guidelines. An election win for Kamala Harris would also see the lead service line replacement continuing to fruition.
该报告推测，未来的政策可能包括进一步加强PFAS的执法和排放准则。如果卡玛拉·哈里斯赢得选举将继续推动主要服务管道的更换。

A Donald Trump-led Republican administration
由唐纳德·特朗普领导的共和党政府

The report's authors suggest things might take a different path should Donald Trump be elected for a second administration. Specifically, measures linked to tackling climate-related risk are likely to be scaled back, with Republicans and Democrats often on opposing sides when it comes to climate action.
该报告的作者建议，如果唐纳德·特朗普当选进入其第二个任期，情况可能会有所不同。具体来说，与应对气候相关风险相关的措施可能会被缩减，因为共和党和民主党在气候行动方面往往处于对立立场。

The report suggests that a Trump administration would 'scale back select measures through administrative avenues and judicial challenges', thanks to an 'ineffectual Congress'.
报告指出，特朗普政府将通过"行政途径和司法挑战"来"缩减特定措施"，这要归因于"无效的国会"。

With policymaking delegated to an appointed group of agency directors, the report suggests a weakening of the National Environmental Policy Act (EPA) through increased rates of 'permitting', allowing corporations and big business to avoid much of the Act's measures. The EPA is also likely to be subject to budget cuts and deregulation under a Trump administration.
由于政策制定权委托给一组指定的机构负责人，该报告建议通过增加"许可"率来削弱《国家环境政策法》(EPA)，从而使企业和大公司能够规避该法案的大部分措施。在特朗普政府下，环境保护署（EPA）也可能面临预算削减和放松监管的情况。

Other policies likely to affect the water industry that could be slowed down or reassessed include the Inflation Reduction Act and some equity-related programs in the SRFs. The report notes that although the Clean and Drinking Water SRF program, which is utilised 'for water infrastructure investments with states, Tribes' is likely to remain a primary source of such funding regardless of administration, the current Republican House majority had at one time proposed cutting SRF appropriations by as much as 60 per cent for the 2024 fiscal year. This would have been the largest cut in the program's history.
其他可能影响水行业的政策，如《通货膨胀减少法案》和一些与股权相关的州循环基金（SRFs）项目，可能会被放缓或重新评估。报告指出，尽管用于"与各州、部落进行水基础设施投资"的清洁和饮用水州循环基金项目在任何政府下都可能仍然是主要资金来源，但目前共和党在众议院的多数曾一度提议在2024财政年度将SRF的拨款削减多达60%。这将是该项目历史上最大的削减。

Potential future water and wastewater applications in the nascent hydrogen energy industry would also be under threat from a Trump election win. As would the continued rollout of the lead service line replacement program.
特朗普当选可能对新兴氢能行业的未来水和废水应用构成威胁，主要服务管道更换项目的持续推进也将受到影响。

What next for PFAS legislation?
PFAS立法的未来何在?

One of the biggest topics in the water industry is the ongoing detection and destruction of PFAS 'forever chemicals'. As recently as May (2024), President Biden announced the introduction of the legally enforceable National Drinking Water Standards, as part of the EPA's PFAS Strategic Roadmap, with the aim of reducing 'PFAS exposure for approximately 100 million people, prevent thousands of deaths, and reduce tens of thousands of serious illnesses'.

水行业最大的议题之一是对PFAS"永久化学物质"的持续检测和销毁。就在最近的2024年5月，拜登总统宣布引入具有法律约束力的国家饮用水标准，作为EPA的PFAS战略路线图的一部分，旨在减少"大约1亿人的PFAS接触，防止数千人死亡，并减少数万例严重疾病"。

Polluters must report the release of the two most common PFAS chemicals - perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) – and the under terms of the CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) Act, the EPA has a strong tool to force polluters to pay for investigations and clean-up operations.
污染者必须报告两种最常见的PFAS化学物质——全氟辛酸（PFOA）和全氟辛烷磺酸（PFOS）的排放情况，根据《综合环境响应、赔偿和责任法案》（CERCLA），这个环境保护署有强有力的工具迫使污染者为调查和清理行动支付费用。

According to the Bluefield Research report, a Trump administration is likely to 'disrupt and delay PFAS regulation through administrative means and litigation roadblocks set forth by chemical manufacturers and affiliated industry groups'.
根据Bluefield Research的报告，特朗普政府可能会"通过行政手段和化学品制造商及其附属行业团体提出的诉讼障碍来干扰和延迟对PFAS的监管"。

The National Environmental Policy Act (NEPA)
《国家环境政策法》（NEPA）

Another key differential between parties relates to The National Environmental Policy Act (NEPA). This federal law dates to 1970 and requires federal agencies to assess the environmental impacts, such as water availability, quality etc, of any proposed action before final decisions are made.
两个政党之间的另一个关键差异与《国家环境政策法》（NEPA）有关。该联邦法律始于1970年，要求联邦机构在做出最终决定之前评估任何拟议行动的环境影响，例如水的可用性、水质等。

For example, whenever federal activities such as airports, buildings, military complexes, highways, parkland purchases are planned, environmental impacts assessments, including potential alternative options, must be conducted to inform the decision-making process.
例如，每当计划进行联邦活动（如机场、建筑物、军事设施、高速公路、公园用地购买）时，必须进行环境影响评估，包括潜在的替代选项，以便为决策过程提供信息。

During his first term as president, Donald Trump had made changes to the Act. However, these were reversed in 2022 by President Biden. It is fair to presume, as the research paper suggests, that a new Trump administration would seek to 'roll back' on NEPA requirements such as those focused on 'climate and social justice'. The research paper's authors conclude that this could lead to increase pollution, health risks and the destruction of rivers and streams.
在担任总统的第一个任期内，唐纳德·特朗普对该法案进行了修改。然而，这些修改在2022年被拜登总统推翻。正如研究报告所表明的那样，可以合理推测，新任特朗普政府将寻求"回退"NEPA的要求，例如那些关注"气候和社会公正"的要求。该研究报告的作者总结称，这可能导致污染增加、健康风险加大以及河流和溪流的破坏。

WATER QUALITY AS A SERVICE OFFERED TO UK UTILITIES
为英国公用事业公司提供水质服务

The UK's water utilities are being offered real-time water quality data and insights as a service by technology company Siemens.
英国的水务公司正由西门子科技公司提供实时水质数据和洞察服务。

Accelerating the pace of digital transformation
加速数字化转型的脚步

According to Siemens, Water Quality Analytics as a Service (WQAaaS) is designed to simply and de-risk 'the process of bringing insight directly into water company operations, accelerating the pace of digital transformation'.
西门子表示，水质分析服务（WQAaaS）旨在简化并降低"将洞察直接引入水务公司运营的过程中的风险，加速数字化转型的脚步"。

The service will offer real-time water quality data and insights via the installation and management of sensors, provided through data connectivity, data visualisation, integration with existing data sources, and analytical insights 'from the treatment works to the customer's tap'.
该服务将通过传感器的安装和管理提供实时水质数据和洞察，其依赖于数据连接、数据可视化、与现有数据源的集成以及"从处理厂到客户水龙头"的分析洞察。

Dr John Gaffney, Siemens technical lead for the Water Quality programme, told media: "There are no scale deployments of clean water quality sensors in the UK water industry: the cost:benefit historically didn't stack up. This was due to unknowns around 'how best to manage sensors' and also the time-consuming nature of manual data analysis."
西门子水质项目的技术负责人约翰·加夫尼博士在接受媒体采访时表示："在英国水务行业，没有大规模部署清洁水质传感器，成本历来与收益不匹配。这是因为在'如何最好地管理传感器'方面存在未知因素，同时人工数据分析也非常耗时。"

He added: "Now these have been overcome through business model design and analytics integration, WQAaaS can be transformative. It gives every UK water company the opportunity to change the paradigm for how they manage their real-time water quality."
他补充道："现在，通过商业模型设计和分析集成，这些问题已得到解决，WQAaaS可以带来变革。它为每个英国水务公司提供了改变其管理实时水质方式的机会。"

Improving maintenance regimes in drinking water networks
改善饮用水管网的维护机制

Operators at the utilities will be able to use analytics modules that are deployed in a secure cloud platform. Analysis of the data being sent from the sensors will allow utilities to review travel time throughout their network, including quantifying the movement of materials. Not only will this help in managing the risk of bacterial growth in water that has remained in the system for long periods, but it will also highlight the risk of water discolouration.
公用事业的运营商将能够使用部署在安全云平台上的分析模块。对传感器发送的数据进行分析将使公用事业公司能够审查其管网中的水流时间，包括量化物质的移动。这不仅有助于控制长时间停留在系统中水的细菌生长风险，还将突出水的变色风险。

With this information, operators will be able to target appropriate interventions in the system, optimising water safety processes and response to incidents, reducing both cost and operational risk. Long-term, the use of the WQAaaS analytics will help to shape network management.
通过这些信息，运营商将能够针对系统进行适当的干预，优化水安全流程和事故响应，从而降低成本和运营风险。从长远来看，使用WQAaaS分析将有助于塑造管网管理。

Partnering with Northumbrian Water
与诺森比亚水务公司合作

The idea of WQAaaS was conceived by both Siemens and Northumbrian Water at the Northumbrian Water Innovation Festival in 2020, with further development input from Water Infrastructure Engineering group at The University of Sheffield.
WQAaaS的构想是在2020年的诺森比亚水创新节上由西门子和诺森比亚水务公司共同提出的，谢菲尔德大学的水基础设施工程小组也对此进行了进一步开发。

The same analytical service approach is currently being used by Northumbrian Water in the Ofwat-funded 'Treatment to Tap' project, which supplies over 100,000 Teesside residents with clean drinking water.
目前，诺森比亚水务公司在Ofwat资助的"从处理厂到水龙头"项目中采用了相同的分析服务方法，该项目为超过100,000名蒂赛德地区居民提供清洁饮用水。

Alan Brown, head of Water Quality for Northumbrian Water, said: "Our customers' expectations are increasing, and we can only meet them by being bold and innovating. Our goal is that nine out of 10 customers choose tap over bottled water, and real-time water quality information will help us get there by getting ahead of problems so we can intervene before customers become aware."
诺森比亚水务公司的水质负责人艾伦·布朗表示："我们客户的期望正在提高，只有通过大胆创新才能满足这些期望。我们的目标是让90%的客户选择水龙头水而不是瓶装水，实时水质信息将帮助我们提前发现问题，从而在客户意识到之前进行干预。"

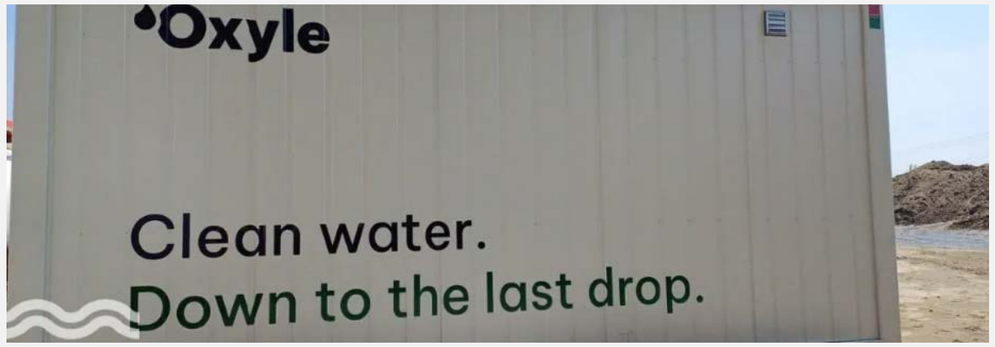
Joby Boxall, professor of water infrastructure engineering at the University of Sheffield, said: "Water quality data is being collected from UK water networks at a volume that has never been seen before. Unlocking value from this requires innovative analytics that provides actionable insights to inform proactive management. Our research with Siemens and the Ofwat funded 'Treatment to Tap' project are world leading examples of this."
谢菲尔德大学水基础设施工程教授乔比·博克斯尔表示："来自英国水管网的水质数据收集量前所未有。要从中释放价值，需要创新的分析方法，提供可操作的洞察，以便进行主动管理。我们与西门子及Ofwat资助的'从处理厂到水龙头'项目的研究是这一领域的世界领先示例。"

Getting ahead of AMP8 performance commitments
提前满足AMP8绩效承诺

According to Siemens, the service will also help UK utilities 'push the standard against the demanding performance commitments that will be set for AMP8'.
西门子表示，该服务还将帮助英国公用事业公司"在即将为AMP8设定的严格绩效承诺中提升标准"。
AMP8 (eighth asset management period, set by UK regulator Ofwat) sets the framework for how water companies manage assets, deliver services to customers, and invest in their infrastructure over a five-year period.
AMP8（由英国监管机构Ofwat设定的第八个资产管理周期）为水务公司如何管理资产、向客户提供服务以及在基础设施上进行投资设定了为期五年的框架。

MOBILE UNIT DESTROYS PFAS WITHOUT SECONDARY WASTE
移动单元在不产生二次废物的情况下销毁PFAS

Groundwater contaminated with per- and polyfluoroalkyl substances (PFAS) will be treated by a fully automated and remotely monitored mobile pilot plant solution operated by Swiss-based water tech company Oxyle.
受到全氟和多氟烷基物质（PFAS）污染的地下水将由瑞士水技术公司 Oxyle 运营的全自动远程监控移动试点工厂解决方案进行处理。



Testing configurations for total PFAS elimination
消除PFAS的测试配置

The pilot is set to run for several months in Belgium. It will treat soil-wash water while testing several different process configurations. The test will identify the most efficient tech configuration and the best way to integrate Oxyle's PFAS destruction solution into the local water cycles.
该试点将在比利时运行几个月，它将处理土壤洗涤水，同时测试几种不同的工艺配置。该测试将确定最有效的技术配置以及将Oxyle的PFAS销毁解决方案整合到当地水循环中的最佳方法。

For Oxyle, the pilot represents an expansion in scale and scope for its mobile pfas destruction unit and a real-world test of project efficiency and quality.

对于Oxyle而言，该试点项目代表了其移动PFAS销毁单元在规模和范围上的扩展以及项目效率和质量的实际测试。

Dr Fajer Mushtaq, CEO and co-founder told Aquatech Online: "PFAS contamination is a critical issue affecting soil health across the world. The insights we gain from this pilot extend far beyond any one site, they are paving the way for the first truly effective and scalable solution to combat PFAS-contaminated soil globally."
首席执行官兼联合创始人Fajer Mushtaq博士对Aquatech Online表示："PFAS污染是影响全球土壤健康的重大问题。我们从这一试点中获得的见解远超任何单个地点，它们为全球应对PFAS污染土壤开辟了第一条真正有效且可扩展的解决方案之路。"

PFAS destruction technology
PFAS销毁技术

Oxyle's solution uses catalyst activated by turbulence in water to break down and mineralize broad-spectra PFAS (from ultra short to long-chain) into harmless by-products like fluoride ions, sulfate ions, and carbon dioxide.
Oxyle的解决方案使用在水中通过湍流激活的催化剂，将广谱PFAS（从超短链到长链）分解和矿化为无害的副产物，如氟离子、硫酸根离子和二氧化碳。

The mechanical activation of the catalyst can be achieved using established water treatment technologies such as turbulent flow or aeration. And because the PFAS are destroyed on a molecular level there is no secondary waste, which means there is no need for any further waste management.
催化剂的机械激活可以使用已建立的水处理技术实现，例如湍流流动或曝气。由于PFAS是在分子水平上被销毁，因此没有二次废物，也就不需要进一步的废物管理。

According to Oxyle, the process uses less than 1 kWh/m³, helping to reduce operating costs when compared to similar solutions.
根据Oxyle的说法，该过程每立方米使用不到1千瓦时，相比于类似解决方案有助于降低运营成本。

Monitoring the solution
监控解决方案

The project will use remote monitoring via proprietary real-time technology to validate the success of the treatment. This real-time remote monitoring will allow the process to be refined and optimised to adjust to fluctuating inlet concentrations.
该项目将使用专有的实时技术进行远程监控，以验证处理是否成功。这种实时远程监控将使工艺得到改进和优化，以调整进水浓度的波动。

The validation process will also help to further tailor the mobile unit ahead of a full-scale implementation.
验证过程还将有助于在全面实施前进一步调整移动单元。

QATAR'S FIRST WATER REUSE FACILITY COULD SAVE UP TO 15,000 CUBIC METRES A DAY
卡塔尔首个水再利用设施每日节水可达15,000立方米

Katara Cultural Village is benefitting from the first water reuse facility in Qatar, which is helping to reduce the reliance on fresh water. The facility is a collaboration between Veolia Water Technologies Qatar and Katara Project.
卡塔拉文化村正受益于卡塔尔的第一个水再利用设施，这将有助于减少对淡水的依赖。该设施是威立雅水技术(Veolia Water Technologies)卡塔尔公司和卡塔拉项目的合作成果。

Reusing water via treated sewage effluent
通过处理污水再利用水资源

Katara is a cultural and commercial complex on the east coast of Doha, Qatar, featuring museums, an opera house, a cinema, conference hall, open-air amphitheatre, a beach, and more, as such it is a haven for tourists.
卡塔拉是位于卡塔尔多哈东海岸的一个文化和商业综合体，拥有博物馆、歌剧院、电影院、会议厅、露天剧场、沙滩等，是游客的天堂。

A Treated Sewage Effluent (TSE) Polishing Plant will recover between 5,000 to 15,000 cubic meters per day by efficiently converting treated sewage effluent into high-quality demineralized water. This water is suitable for use in both irrigation and the district's cooling towers. Previously, fresh water would have come from desalinated sea or brackish water.
一个处理过的污水排放水（TSE）精加工厂通过高效地将处理过的污水转化为高质量的去矿化水，每天可回收5,000到15,000立方米的水。这些水适合用于灌溉和该地区的冷却塔。而在此前，淡水主要来自于海水或苦咸水的淡化。

The plant is the first of its kind in the region and was designed to optimise both the space and power supply constraints within the Katara Energy Centre, helping to reduce costs – now 1 QAR compared to 9 QAR per cubic meter; the power needed for water production has been reduced by 20 per cent.
该工厂是该地区首个此类设施，旨在优化卡塔拉能源中心的空间和电力供应限制，以帮助降低成本——每立方米水的价格从9卡塔尔里亚尔降至1卡塔尔里亚尔，生产水所需的电力减少了20%。

Veolia Water Technologies Qatar will provide ongoing supervision of the operation and maintenance of the plant.
威立雅水技术卡塔尔公司将持续监督该工厂的运营和维护。

Meeting Qatar's 2030 environmental goals
实现卡塔尔2030年环境目标

The project is contributing to fulfilling the environmental development goals for Qatar's National Vision 2030 strategy. These goals aim to conserve fresh water and promote sustainable water use. The region faces many water challenges and althogh this project is the first of its kind, other Emirates are also taking water reuse serioulsy. For example, Abu Dhabi introduced a Water Recycling Policy in 2019.
该项目有助于实现卡塔尔2030年国家愿景战略的环境发展目标。这些目标旨在保护淡水资源并促进可持续用水。该地区面临着许多水资源挑战，虽然该项目是首个此类项目，但其他阿联酋国家也在认真对待水再利用问题。例如，阿布扎比在2019年引入了水回收政策。

It also aligns with Veolia's GreenUp strategic program, which aims to help countries and regions adapt to climate change.
该项目还与威立雅的"GreenUp"战略计划相一致，旨在帮助国家和地区适应气候变化。

Thierry Froment, CEO of Veolia Water Technologies Middle East told media: "This project not only conserves the precious freshwater, but also exemplifies the sustainable water use in the city. By transforming treated sewage into high quality water for irrigation and cooling, we are pioneering a new standard resource management efficiency and sustainability for the region."
威立雅水技术中东地区首席执行官Thierry Froment对媒体表示："该项目不仅节约了宝贵的淡水资源，还展示了城市中的可持续用水。通过将处理过的污水转化为用于灌溉和冷却的高质量水，我们正在为该地区开创一种新的资源管理效率和可持续性标准。"

Mohammed AL Meer, director general of Katara Project added: "The launch of the Treated Sewage Effluent Polishing Plant is a groundbreaking achievement and a testament to our dedication to environmental sustainability. This project and collaboration with VWT Qatar allowed us to reduce our freshwater consumption and align this progress with Qatar National Vision 2030. By utilizing treated sewage for irrigation and cooling, we are not only preserving vital natural resources, but also setting a new benchmark for sustainable practices in cultural and touristic destinations."
卡塔拉项目的总干事Mohammed AL Meer补充道："处理污水排放水精加工厂的启动是一个开创性的成就，证明了我们对环境可持续性的承诺。这个项目与威立雅水技术卡塔尔公司的合作使我们能够减少淡水消耗，并将这一进展与卡塔尔2030年国家愿景对接。通过利用处理过的污水进行灌溉和冷却，我们不仅保留了重要的自然资源，还为文化和旅游目的地设定了可持续实践的新基准。"

UK UTILITY TO USE TREATED WASTEWATER TO BOOST DRINKING WATER RESERVOIR
英国公用事业公司将利用处理废水补给饮用水水库

UK utility Southern Water plans to top up a spring-fed reservoir with treated effluent to boost water supplies during drought.
英国公用事业公司南方水务(Southern Water)计划用处理过的污水来补充一个由泉水供给的水库，以提高干旱期间的水供应。

Using treated effluent to boost water supplies
使用处理过的污水来增加水供应

The scheme would be the first in the country to use treated wastewater to top up a reservoir. The water would be piped to the reservoir from the Budds Farm wastewater treatment plant in nearby Havant.
该计划将是该国首个使用处理过的废水来补充水库的项目。水将通过管道从附近哈文特（Havant）的巴兹农场（Budds Farm）废水处理厂输送到水库。

Regulators in approving the plans pointed to similar schemes being used in other countries to ensure steady and regular supplies of water during periods of drought.
监管机构在批准该计划时指出，其他国家已经实施类似的项目，以确保在干旱时期保持稳定和定期的水供应。

Tim McMahon, water director at Southern Water, told the media that urgent action was required to meet increasing demand for water and to protect Hampshire's chalk streams. "More than 2.5 billion extra litres of water a day will be needed in our region by 2050. [This project] will create a new safe and dependable source of supply that will help keep taps and rivers flowing."
南方水务公司的水务总监蒂姆·麦克马洪（Tim McMahon）对媒体表示，必须采取紧急行动，以满足日益增长的用水需求并保护汉普郡（Hampshire）的白垩岩溪流。“到2050年，我们地区每天将需要超过25亿升的额外水量。这个项目将创造一个新的安全可靠的水源，有助于保证水龙头和河流的持续流动。”

The water recycling plant is expected to supply up to 90 million litres of drinking water a day and be operation by 2034. Effluent will be treated using reverse osmosis before entering the reservoir, from there it would be pumped 25 miles to Otterbourne, Hampshire, where it would be treated further to meet drinking water standards.
该水回收厂预计每天将供应高达9000万升的饮用水，并计划于2034年投入运营。污水将在进入水库之前进行反渗透处理，随后将被抽送25英里到汉普郡的奥特本（Otterbourne），在那里的进一步处理将满足饮用水标准。

Scheme involves first new reservoir to be built since the 1980s
计划涉及自1980年代以来建造的首个新水库

The Havant Thicket Reservoir will be the first large-scale reservoir to be built in the UK since the 1980s. It is being built on a 395-acre site owned by Portsmouth Water and will be mainly fed from excess water from natural springs. It will hold up to 8.7 billion litres of water and could supply up to 21 million litres each day. At present, any excess water is released into the Solent.
哈文特灌丛水库（Havant Thicket Reservoir）将是自1980年代以来在英国建造的第一个大型水库。它建于一个由朴茨茅斯水务公司(Portsmouth Water)拥有的395英亩地块上，主要由自然泉水的多余水量供水。该水库将可储存高达87亿升水，日供应量可达2100万升。目前，任何多余的水都会释放到索伦特海峡（Solent）中。

The overall system from wastewater plant to drinking standard purification will be operated year-round, with a base rate of 30 million litres a day.
从污水处理厂到满足饮用水标准的净化系统将全年运行，基础供应量为每天3000万升。

Rob Lawless, programme lead for Water for Life, Hampshire: "Although water recycling is a new thing for our customers, it's been used around the world for more than 40 years. I'm proud to be working on a project that will help us provide a resilient water supply long into the future, benefiting people and wildlife across Hampshire and the Isle of Wight for many years to come."
汉普郡“生命之水”项目负责人罗布·劳利（Rob Lawless）表示：“尽管水回收对我们的客户来说是个新事物，但在全球范围内已使用超过40年。我很自豪参与这个项目，它将帮助我们在未来提供稳定的水供应，造福汉普郡和怀特岛的人们和野生动物，为未来许多年带来益处。”

AQUA TECHNOLOGY

Protecting the world's rare chalk streams
保护世界稀有的白垩岩溪流

Southern Water says that scheme would mean far less water would need to be extracted from two chalk streams, the Test and the Itchen, which are both rare and environmentally at risk.
南方水务表示，该计划将意味着从两条环境风险较高且稀有的白垩岩溪流——特斯河（Test）和伊钦河（Itchen）中抽取的水量将大大减少。

There are only 200 chalk streams and rivers in the world, with 85 per cent of them located in the south and southeast of England. They maintain diverse eco-systems that are at threat from a number of sources, such as over-abstraction and agricultural pollution.
全球仅有200条白垩岩溪流和河流，其中85%分布在英格兰南部和东南部。它们维持着多样的生态系统，但也正在遭受着过度抽水和农业污染等诸多威胁。

Opposition to the scheme
对该计划的反对

Despite the reduction in chalk stream abstraction, the scheme has come under fire, with concerns about pollution from rejected treated effluent reaching the Solent, the stretch of water between the south coast of England the Isle of Wight.
尽管减少了对白垩岩溪流的抽水，但该计划仍受到了抨击，人们担心未处理的污水会污染索伦特海峡，这段水域位于英格兰南海岸和怀特岛之间。

Many opposed to the scheme site the fact that the UK receives high levels of rainfall and that, perhaps, the money would be better invested in other schemes. The Guardian quoted the former director of Southern Water, Bill Cutter, as opposing the scheme because, "The costs are horrendous. It's a good idea if you're living in a country where there is no water, but you can't say the UK has no water."
许多反对该计划的人指出，英国降雨量很高，或许将资金更好地投入其他项目会更合理。《卫报》引用了南方水务前董事比尔·卡特（Bill Cutter）的观点，他反对该计划，认为"成本过高，如果你住在缺水的国家，这个主意不错，但你不能说英国没有水。"

It also reported Tracey Viney, an environmental specialist, as saying, "This is not a sustainable solution. We get plenty of rainwater and should be developing schemes to store water for use in dry summers."
环境专家特雷西·维尼（Tracey Viney）表示："这不是一个可持续的解决方案。我们有足够的雨水，应该开发存储水资源的方案，以备干旱夏季使用。"

Southern Water lost an estimated 108.5 million litres of water a day in 2022-23 through leaks, according to most recent figures, with some campaigners saying the money would be better spent tackling leaking infrastructure. The company has also been hit with heavy fines in recent years for polluting rivers and coastal water.
根据最新数据显示，南方水务在2022-23年度估计每天流失1.085亿升水，一些活动人士表示，这些资金更应该用于解决漏水基础设施问题。该公司近年来因污染河流和沿海水域而遭到严重罚款。
Regulator, Ofwat, has recently proposed annual bill increases of 44 percent (€217) by 2030.
监管机构Ofwat最近提议到2030年，年度账单增加44%（约217欧元）。

PRESSURE FOR METHANE MITIGATION METHODS HIGHLIGHTS A MYRIAD OF TECH SOLUTIONS
甲烷减排方法突显对多种技术解决方案的迫切需求

Amid the conundrum of balancing methane mitigation with efforts to achieve SDG6, emissions-conscious utilities are investigating the impact of their own wastewater and sludge treatment processes. With more utilities including direct methane emissions in their carbon accounting, basic solutions such as covering tanks represent one avenue to explore while the next step is to implement anaerobic digestion and biogas handling infrastructure.
在平衡甲烷减排与实现可持续发展目标 6(SDG6)之间的难题中，注重排放的公用事业公司已经在调查其废水和污泥处理过程的影响。随着越来越多的公用事业公司将直接的甲烷排放纳入其碳核算中，一些基本解决方案，如覆盖储罐，成为了一个可探索的途径，而下一步是实施厌氧消化和沼气处理基础设施。

Mapping the extent of the methane problem
甲烷问题的覆盖范围

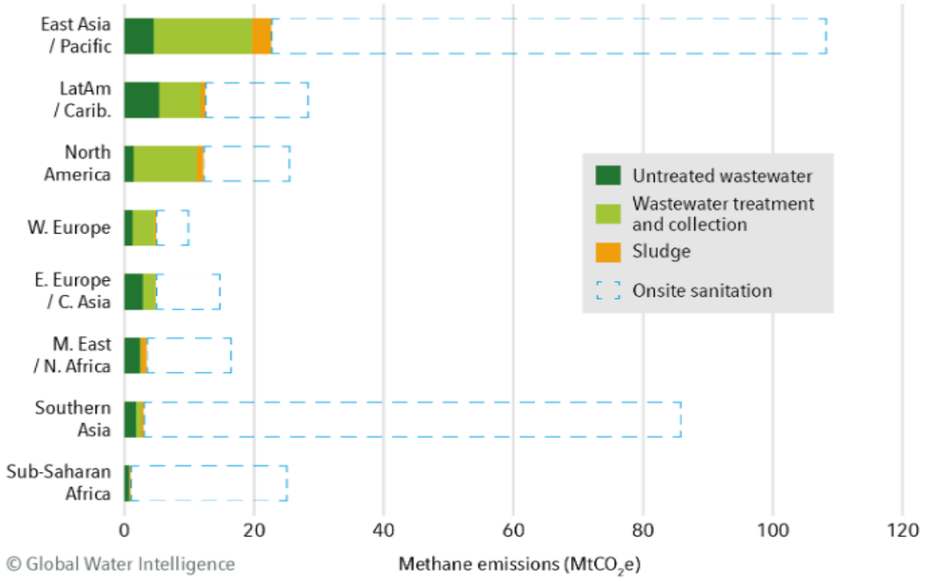
Despite solutions such as anaerobic digestion being available, the market is now looking into how methane from other parts of the treatment train can be mitigated, such as from post-digestion storage leakage using vacuum degassing. Other technologies being explored include the removal of dissolved methane from wastewater streams.
尽管已有厌氧消化等解决方案可用，但市场目前正关注如何减轻来自处理流程其他部分的甲烷排放，例如，通过真空脱气来减少消化后储存的泄漏。其他探索的技术还包括去除废水流中的溶解甲烷。

GWI calculations suggest that the methane footprint of the water industry is expected to amount to 4.7 per cent of global methane emissions on an annual basis, and these emissions are on a solid upward trajectory – unlike the emissions associated with energy consumption

in treatment infrastructure which are gradually being reduced. Key emitters include the storage of sludge after digestion, and the use of uncovered secondary digesters (a particularly prominent design in the UK), as well as primary clarifiers and the inlet to the wastewater treatment plant.
国际环保平台（GWI）的计算表明，水行业的甲烷排放量预计将占全球甲烷排放的4.7%，而这些排放量正处于稳步上升的趋势——这与处理基础设施中与能耗相关的排放量逐渐减少形成对比。主要的排放源包括消化后污泥的储存、未覆盖的二级消化池（这是在英国尤其突出的设计）、初沉池以及污水处理厂的进水口。

A significant amount of methane emissions are also produced in onsite sanitation, as covered in GWI's Water Without Carbon white paper, although the topic will not be covered in this market map. The speed at which methane is released is also the key to why the industry needs to act quickly, as the gas is particularly potent in the first 12 years of its life. The extent of global water sector methane emissions is displayed in the below graphic.
现场卫生设施也会产生相当数量的甲烷排放，尽管GWI的《无碳水白皮书》中对此进行了讨论，但该市场中不会涉及这一主题。甲烷释放的速度也是该行业需要迅速行动的关键原因，因为这种气体在生命周期的前12年尤其有效。全球水务部门的甲烷排放规模如下图所示。

Methane is piquing the interest of particularly climate-focused governments, with the Netherlands and Nordic region likely to lead the way. In 2007, Sweden became the first country to introduce a voluntary commitment programme to minimise methane leaks from biogas production and this approach is now being echoed in countries such as Denmark.
甲烷引起了一些特别关注气候变化的政府的兴趣，荷兰和北欧地区可能首当其冲。2007年，瑞典成为第一个推出自愿承诺计划，以最小化沼气生产中甲烷泄漏的国家，这种做法现在在丹麦等国得到了响应。



NO DIG LEAK REPAIR SOLUTION ACHIEVES IMPRESSIVE TRIAL RESULTS AT THAMES WATER
非开挖漏损修复方案在泰晤士水务公司取得显著试验成果

UK water utility Thames Water has reported impressive results from using Origin No Dig® to repair leaks.
英国泰晤士水务公司报告称，使用 Origin No Dig® 修复漏损取得了显著的结果。

Leak repair with minimum disruption
具有最小干扰的漏损修复

The utility has been trialling the solution since February in an attempt to reduce the disruption caused by normal leak repairs – digging trenches, roadworks, traffic control – which are both expensive and time consuming.
该公司自2月份以来一直在试验这一解决方案，旨在减少常规漏损修复所造成的干扰——挖掘沟渠、道路施工、交通管制——这些过程既昂贵又耗时。

The solution can be applied in approximately 15 minutes, essentially stopping leaks in almost-real time and without the need for road closures. And while the repairs are a temporary to allow further investigation and planning for further repairs, there have been instances of repairs lasting for more than a year on earlier adopter infrastructure.
该解决方案可以在大约15分钟内进行应用，基本上可以几乎实时地停止漏水，而无需封闭道路。虽然对这些漏损的修复是临时的，以便进一步调查和规划后续修复，但在早期采用的基础设施中，确实有修复时间超过一年的情况。

Thames Water posted on LinkedIn that the trial had produced impressive results, including:
泰晤士水务在LinkedIn上发布消息称，试验产生了令人瞩目的结果，包括：

• A 90 per cent success rate on first visit leak repairs;
• 首次访问漏水修复的成功率达到90%;

• An average repair time of 15 minutes, minimising public disruption;

• 平均修复时间为15分钟，尽量减少对公众的干扰；

• Enabled repairs complex sites without road closures;
• 在没有道路封闭的情况下，能够修复复杂的现场；

• Reduced leak backlogs by 48,000 days;
• 将漏水积压减少了48000天；

• Saved approximately 12.5 Ml/day of water through leak reduction.
• 通过减少漏损，每天节省了大约12.5兆升的水。

Food coagulant leak repair
食品凝固剂修复漏损

Origin No Dig® is a food-grade coagulant that is injected into the pipe network. It goes through the pipes and finds the cracks, sealing them to stop the leak. It is not heat activated and uses no chemicals, it is made of water, gel and minerals.
Origin No Dig®是一种食品级凝固剂，可以注入管网中。它通过管道找到裂缝，将其密封以停止漏水。该产品不需要热激活，也不使用任何化学物质，由水、凝胶和矿物质制成。

John Marsden, commercial director at Origin Tech Ltd, told Aquatech Online: "Origin No Dig is patented technology developed with support from Northumbrian Water. We started product development in 2020 and as of today have completed over 2,000 repairs without roadworks or digging up the roads or paths."
Origin Tech Ltd的商业总监约翰·马斯登（John Marsden）在接受Aquatech Online采访时表示："Origin No Dig是与诺森比亚水务公司合作开发的专利技术。我们于2020年开始产品开发，截至目前已完成超过2000次的修复，且是在没有进行道路施工或挖掘道路和人行道的情况下进行的。"

On its composition, Marsden said: "It's made of just three components. Water, a food grade thickener like that found in yoghurts, and calcium carbonate particles sized to mesh together to block the water path out of a leak. There's no chemical reaction and the product has been tested and passed the tests required by the DWI."
关于其成分，马斯登表示："它仅由三种成分组成：水、类似于酸奶中使用的食品级增稠剂以及大小适合相互结合以阻塞漏水水流的碳酸钙颗粒。没有化学反应，该产品经过测试并通过了饮用水监察局（DWI）所需的测试要求。"

The technology has been adapted from products that have been used in the oil and gas industry for many years, and was developed in partnership with Aubin, a provider of chemical solutions.
该技术是与化学解决方案提供商Aubin合作开发的，采用了多年来在石油和天然气行业中使用的产品。

It has been tested in compliance with BSI standard BS6920 - Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water.
它已根据BSI标准BS6920进行测试——该标准是评估非金属产品在与人类饮用水接触时的适用性，特别是对水质的影响。

Origin started working with Thames Water in February (2024) and has so far repaired 500 leaks without causing any disruption to their customers.
Origin于2024年2月开始与泰晤士水务合作，迄今为止已修复500处漏损，且未对客户造成任何干扰。

Marsden added: "We are delighted that companies like Thames are adopting our technology which we believe will be a game changer at reducing leakage across the UK and eventually globally."
马斯登补充道："我们很高兴像泰晤士这样的公司正在采用我们的技术，并且我们相信这将成为减少英国乃至全球漏损的变革者。"

Developed with Northumbrian Water
与诺森比亚水务共同开发

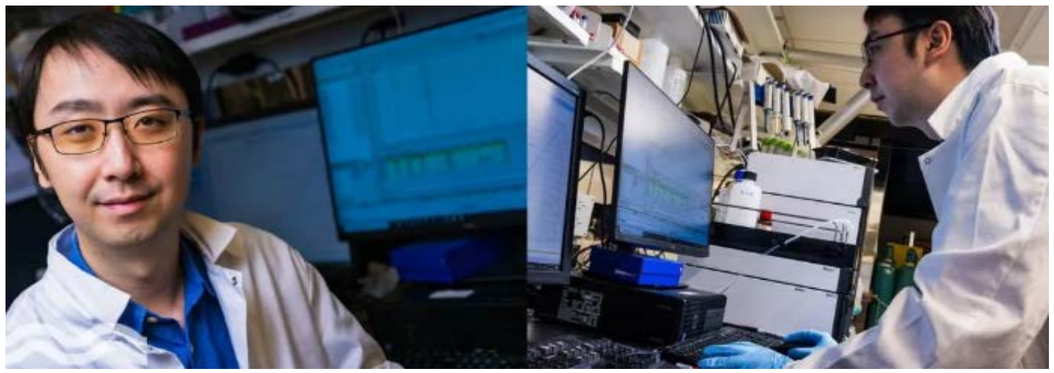
Origin No Dig® developed the technology with Northumbrian Water. The utility has been using the solution for 18 months and in that time has carried out over 1,000 repairs.
Origin No Dig®与诺森比亚水务共同开发了这项技术。该水务公司已使用该解决方案18个月，在此期间进行了超过1000次的修复。

Kieran Ingram, water director at Northumbrian Water, told Aquatech Online: "The revolutionary solution is helping teams to improve the speed at which they can fix leaks by avoiding us digging up roads and pavements, which can come at a real cost to the business. More importantly though, it helps to minimise customer disruption, as it avoids road and footpath closures as well as emergency traffic measures.
诺森比亚水务的水务总监基兰·英格拉姆（Kieran Ingram）在接受Aquatech Online采访时表示："这项革命性解决方案帮助团队提高了修复漏损的速度，因为它避免了我们挖掘道路和人行道，这可能会给企业带来真正的成本。不过，更重要的是，它有助于减少对客户的干扰，因为它避免了道路和人行道的封锁以及紧急交通措施管控。

"The product was initially developed during a design sprint at our Innovation Festival back in 2021, alongside partners at Origin Tech - and now we are incredibly proud to see it being used in the field by operational teams across all of our operating areas."
"该产品最初是在2021年我们的创新节的设计冲刺期间与Origin Tech的合作伙伴一起进行开发的，现在我们非常自豪地看到它在我们所有运营区域的运营团队中得到了应用。"

DECARBONISED AMMONIA PRODUCTION TREATS NITRATE-CONTAMINATED WATER
脱碳氨生产处理硝酸盐污染水

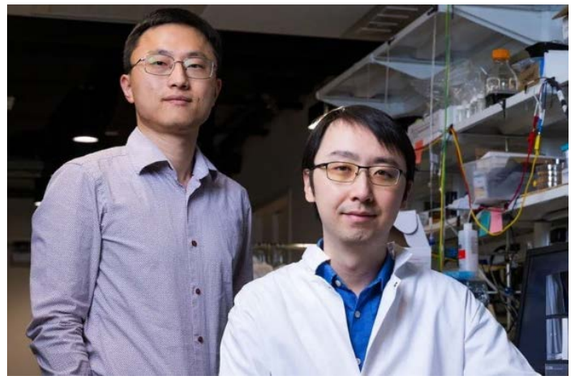
The development of a reactor that decarbonises the production of ammonia has the potential to remove the need for denitrification at wastewater plants.
开发出一种脱碳氨生产的反应器，有可能消除污水处理厂对反硝化的需求。



Converting nitrates into ammonia
将硝酸盐转化为氨

The research was carried out by a team of engineers led by Haotian Wang at Rice University in Houston, Texas; it was published in Nature Catalysis. The reactor system converts nitrates, which are common pollutants found in industrial wastewater and agricultural runoff, into ammonia, a vital chemical used in fertilizers, and therefore plays a critical role in sustaining food production for the world's growing population.
这项研究由德克萨斯州休斯顿莱斯大学的王浩天（Haotian Wang）教授领导的工程师团队进行研发的，结果发表在《Nature Catalysis》期刊上。该反应器系统将硝酸盐转化为氨，其中硝酸盐是工业废水和农业径流中常见的污染物，而氨是用于肥料的重要化学品，因此在支持全球日益增长的人口的粮食生产中发挥着关键作用。

Ammonia is also used in a wide range of industrial and commercial products, from household cleaners to plastics, explosives and fuel. However, as one of the world's most widely produced chemicals, its production accounts for about 2 per cent of global energy consumption and 1.4 per cent of carbon dioxide emissions.
氨还被广泛用于各种工业和商业产品中，从家用清洁剂到塑料、炸药和燃料等。然而，作为全球生产量最大的化学品之一，氨的生产约占全球能源消耗的2%和二氧化碳排放的1.4%。



An alternative production process
替代生产过程

The main way to make ammonia is the Haber-Bosh process, which entails a reaction between hydrogen and nitrogen that occurs under high temperature and pressure conditions and is dependent on large-scale centralized infrastructure.
生产氨的主要方式是哈伯-博施法（Haber-Bosh法），这需要在高温高压条件下进行氢和氮的反应，并依赖于大规模的集中基础设施。

However, an alternative is to use electrochemical synthesis, which involves the use of electricity to drive chemical reactions.
然而，另一个替代方法是使用电化学合成，这涉及利用电力驱动化学反应。

Feng-Yang Chen, a Rice graduate student, and lead author on the study, told media: "Electrochemistry can occur at room temperature, is more amenable to scalable formats for different infrastructure systems, and has the capacity to be powered by decentralized renewable energy."
本研究的主要作者、莱斯大学的研究生陈风扬（Feng-Yang Chen）告诉媒体："电化学可以在室温下进行，更适合不同基础设施系统的可扩展格式，并且可以利用分散的可再生能源供电。"

He added: "However, the current challenge for this technology is that large quantities of additive chemicals are required during the electrochemical conversion process. The reactor we developed uses recyclable ions and a three-chamber system to improve the reaction's efficiency."
他补充说："然而，当前这项技术面临的挑战是，在电化学转化过程中需要大量的添加化学剂。我们开发的反应器采用的是可回收离子和三室系统来提高反应效率。"

Pure ammonia and clean water
纯氨和清洁水

The system uses of a porous solid electrolyte, which eliminates the need for high concentrations of supporting electrolytes - an issue that has hampered previous attempts to convert nitrates to ammonia sustainably. A future application that powered the conversion process with renewable energy would render ammonia production through this process effectively carbon-neutral.
该系统使用了一种多孔固体电解质，从而消除了对高浓度辅助电解质的需求——这一问题曾阻碍了将硝酸盐可持续地转化为氨的先前尝试。未来如果能利用可再生能源为转化过程提供动力，那么通过这一过程生产的氨实际上将有效地实现碳中和。

The experiment flowed nitrate-contaminated water through this reactor and measured the amount of ammonia produced and the purity of the treated water.

实验将硝酸盐污染的水流过该反应器，并测量产生氨的数量及处理后水的纯度。

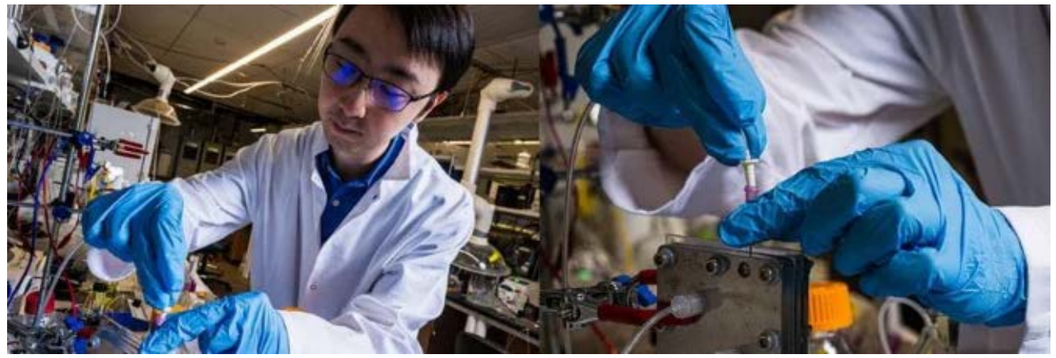
"We discovered that our novel reactor system could turn nitrate-contaminated water into pure ammonia and clean water very efficiently, without the need for extra chemicals," Chen explained. "In simple terms, you put wastewater in, and you get pure ammonia and purified water out."
"我们发现，我们的新型反应器系统能够非常高效地将硝酸盐污染水转化为纯氨和清洁水，而无需额外的化学物质。"陈风扬解释道，"简单来说，就是将废水投入系统，随后获得纯氨和净化水。"

Removing the need for nitrification
减少对硝化的需求

The system makes possible an electrochemical nitrate-to-ammonia conversion pathway that would eliminate the need for denitrification at wastewater treatment plants.
该系统使得电化学硝酸盐转化为氨的路径成为可能，从而消除了污水处理厂对反硝化的需求。

Pedro Alvarez, the George R. Brown professor of Civil and Environmental Engineering, director of the Nanosystems Engineering Research Center for Nanotechnology-Enabled Water Treatment (NEWT) and the Water Technologies Entrepreneurship and Research (WaTER) Institute at Rice University told media: "Nitrate is one of the priority pollutants that most frequently violates drinking water standards, and it is a significant concern in growing cities as farmland with nitrate-contaminated groundwater supplies is converted to urban development."
莱斯大学土木与环境工程的乔治·R·布朗教授、纳米技术水处理工程研究中心（NEWT）和水技术创业与研究（WaTER）研究所的主任佩德罗·阿尔瓦雷斯（Pedro Alvarez）告诉媒体："硝酸盐是最经常违反饮用水标准的首要污染物之一，而且在发展中的城市中，含硝酸盐的地下水资源的农田被转变为城市开发，已成为一个重要问题。"

Alvarez added: "Conventional nitrate removal in drinking water treatment involves ion exchange or membrane filtration by reverse osmosis, which generates brines and transfers the nitrate problem from one phase to another." Professor Wang's innovation is very timely and important, as it offers a solution that eliminates nitrate toxicity and associated liability without the need to add treatment chemicals.
阿尔瓦雷斯补充道："传统的饮用水处理中的硝酸盐去除涉及离子交换或反渗透膜过滤，这会产生浓盐水，并将硝酸盐问题从一个阶段转移到另一个阶段。"王教授的创新恰逢其时且十分重要，因为它提供了一种解决方案，可以消除硝酸盐的毒性和相关责任，而无需添加处理化学物质。



Beyond ammonia, future reactor research
除了氨，未来反应器研究

According to the research team, the implications of this work extend beyond ammonia production. They believe that the design of the reactor and the study's accompanying techno-economic assessment can help inform further research into other eco-friendly chemical processes, potentially transforming how industries address environmental challenges.
根据研究团队的说法，这项工作的影响不仅限于氨的生产。他们认为，反应器的设计和这项研究伴随的技术经济评估将有助于推动对其他生态友好化学过程的进一步研究，从而可能改变工业应对环境挑战的方式。

Wang said: "Our findings suggest a new, greener method of addressing both water pollution and ammonia production, which could influence how industries and communities handle these challenges. If we want to decarbonise the grid and reach net-zero goals by 2050, there is an urgent need to develop alternative ways to produce ammonia sustainably."
王教授表示："我们的研究结果提出了一种新型的、更环保的方法来应对水污染和氨生产，这可能会影响工业和社区应对这些挑战的方式。如果我们希望实现电网脱碳并在2050年前达到净零排放目标，就迫切需要开发可持续生产氨的替代方法。"

ROADWATER RUN-OFF RECLAMATION SPANS FOUR COUNTRIES
道路水径流回收项目覆盖四个国家

Four European countries are working together to tackle the problems associated with water running off roads.
四个欧洲国家正在携手共同应对与道路水径流相关的问题。

Rural roadwater rescue project
农村道路水救援工程

The Rural Roadwater Rescue (RRR) project aims to demonstrate the viability and scalability of Climate Adaptive Waterhubs, where water running off roads can be captured, cleaned, stored, distributed, and then used to benefit rural communities in times of water scarcity.
农村道路水救援（RRR）项目旨在展示气候适应性水中心的可行性和可扩展性，在这些水中心中，道路上的水可以被收集、净化、储存、分配，然后在水资源短缺时惠及农村社区。

To do this, a northwest European coalition of countries – Germany, France, Belgium, Netherlands – are developing guidance for regulatory frameworks, identifying ways of involving local communities, as well as finding practicable solutions and an action plan to implement them through transformation of existing road networks.
为此，德国、法国、比利时和荷兰等西北欧洲国家的联盟正在制定监管框架的指导方针，识别涉及当地社区的方式，以及寻找可行的解决方案和实施行动计划，通过改造现有的道路网来实现这些目标。

With weather events becoming increasingly imbalanced, the project's stakeholders recognise that existing systems are no longer sufficient to cope with either excess run-off or scarcity.
随着天气事件日益失衡，项目的利益相关者认识到，现有系统已不足以应对过量径流或水资源短缺。

Transnational collaboration
跨国合作

The project is being coordinated by Rijkswaterstaat – the Dutch Ministry of Infrastructure and Water Management.
该项目由荷兰基础设施和水管理部（Rijkswaterstaat）协调。

Initiator and project manager at Rijkswaterstaat, Stan Kerkhofs, told Aquatech Online: "Roads can play a wider societal role then only bringing vehicles efficiently from A to B. RRR can be seen as first step in broadening the societal role of roads by collecting, treating, transporting water from roads to local demand."
Rijkswaterstaat的发起人和项目经理斯坦·克尔霍夫斯在接受Aquatech Online采访时表示："道路不仅仅是高效地使车辆从A点行驶到B点，它还可以发挥更广泛的社会作用。RRR可以被视为拓宽道路社会作用的第一步，通过收集、处理和运输道路水以满足当地需求。"

He added: "With more heavy rains due to climate change the present focus is mainly on quickly disposing water from roads. On the other hand, periods of drought and shortages in water also increase. Designing or adapting roads to collect water can contribute to climate resilience of roads and relieve water shortages in the local environment."
他补充道："由于气候变化，降雨量增加，目前的重点主要是快速处理道路上的水。另一方面，干旱和水资源短缺的时期也在增加。设计或改造道路以收集水可以增强道路的气候韧性，并缓解当地环境中的水资源短缺。"

The transnational, cross-sectoral, multidisciplinary cooperative network also includes:
该跨国、跨部门、多学科的合作网络还包括：

- VMM Flanders Environment Agency, Belgium
- 比利时弗兰德斯环境局（VMM）

- CK cooperative Kloostersland, Netherlands
- 荷兰克洛斯特兰合作社

- TZW, DVGW Water Technology Center, Germany
- 德国水技术中心

- CEREMA Centre for Studies on Risks, the Environment, Mobility and Urban Planning, France
- 法国风险、环境、交通和城市规划研究中心

- IMEC Interuniversitair Micro-Electronica Centrum, Belgium
- 比利时国际微电子中心

Multi-functional road networks
多功能道路网络

Taking inspiration from projects in Heverlee, Belgium, and Oirschot/Kloosters in the Netherlands, the RRR project seeks to demonstrate how traditionally mono-use roads can become part of the wider water management network. For example, can space under or next to the road become temporary reservoirs for road run-off water, and what this would mean in terms of local regulatory compliance for both infrastructure and water quality.
受比利时赫弗利和荷兰奥尔斯霍特/克洛斯特的项目启发，RRR项目旨在展示传统的单一用途道路如何成为更广泛的水管理网络的一部分。例如，道路下方或旁边的空间能否成为道路径流水的临时储水池，以及这对基础设施和水质的地方法规合规性意味着什么。

In the longer-term, treatment and distribution of the water will be considered, including how this

will fit into local planning and regulatory frameworks.
从长远来看，将考虑水的处理和分配，包括这如何融入地方规划和监管框架。

The RRR project is seen as the initial stage in what will become a framework that can be replicated, implemented, and piloted in other areas.
RRR项目被视为一个初始阶段，它将成为一个框架，可以在其他领域复制、实施和试点。

There are seven key areas that need to be addressed:
这需要解决七个关键领域：

- Collection of road runoff water
- 收集道路径流水

- Cleaning or reprocessing (natural, semi-technical, technical)
- 净化或再处理（水的自然、半技术性和技术性处理）

- Storage
- 储存

- Distribution
- 分配

- Use
- 使用

- Avoidance of pollutant inputs
- 避免污染物输入

- Influencing ecosystems
- 影响生态系统

Run run-off treatment in action
道路径流处理的实际行动

A meeting of partners in June (2024) took place at the road runoff water treatment plant near Ettlingen, Germany, on the A5 motorway, with an additional visit to the Karlsruhe motorway maintenance department, organised by Die Autobahn GmbH.
2024年6月，合作伙伴会议在德国艾特林根附近的道路径流水处理厂举行，会议期间还组织了对卡尔斯鲁厄高速公路维护部门的访问，活动由德国高速公路有限责任公司（Die Autobahn GmbH）安排。

Here, the water draining from the motorway collects via gullies. The water is treated through oil separation and sedimentation. The water is stored with further sedimentation taking place in a settling basin. It is then returned to the water cycle in coordination with the lower water authority, either via infiltration into the groundwater or as a discharge into local rivers.
在这里，来自高速公路的水通过排水沟收集。水通过油分离和沉淀进行处理。处理后的水在沉淀池中进行进一步沉降后储存。然后，水在与当地水管理局协调后重新返回水循环，通过渗透进入地下水或排放到当地河流中。

企业名称 COMPANY NAME	伊乐科环保科技（上海）有限公司 Electropure Environmental Technology (Shanghai)-Co.,Ltd
联系人姓名 CONTACT NAME	李永军 LI YONGJUN
联系手机 CONTACT CELL PHONE	136-2191-3161
联系邮箱 CONTACT EMAIL	info@snowpure-edi.com 13621913161@163.com
企业网址 COMPANY WEB	https://www.snowpure.com/ www.snowpure-edi.com

企业介绍
COMPANY PROFILE

SnowPure 公司总部位于美国加利福尼亚州，自1977 年开始研究和发展 EDI 技术，作为全球 EDI 的先驱者，目前，我们的产品在全球已超过 75 个国家或地区均已成功应用。产品主要应用于化工、电力、钢铁、冶金、造纸、光伏、半导体等众多行业。
伊乐科环保科技（上海）有限公司是 2006 年由美国 SnowPure 公司在中国投资建立的子公司，主要开展亚太地区 Electropure EDI 和 Excell Nano NF 产品的市场销售、技术服务、售后维修及产品检测服务，旨在为广大的客户提供更及时、更便捷、原厂商面对面的全方位服务。

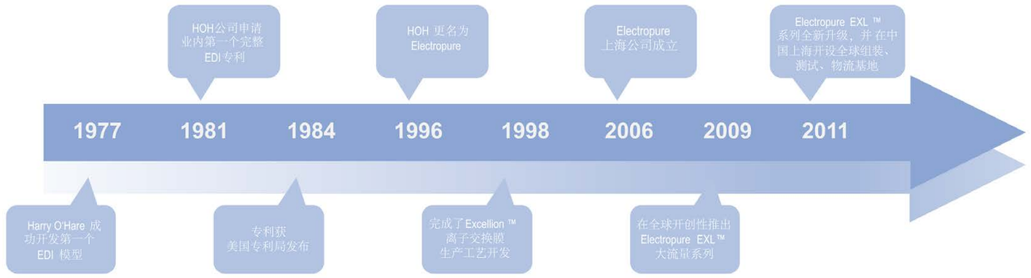
Electropure® EDI
High Technology Water

企业介绍
COMPANY PROFILE

SnowPure, headquartered in California, USA, has been researching and developing EDI technology since 1977. As a pioneer in global EDI, our products have successfully been applied in over 75 countries and regions worldwide. Our products are primarily used in a variety of industries, including chemicals, power, steel, metallurgy, paper-making, photovoltaic, and semiconductor.

Electropure Environmental Technology (Shanghai)Co.,Ltd. is a subsidiary established in China in 2006 by the American company SnowPure. It primarily engages in the market sales, technical services, after-sales maintenance, and product testing services for Electropure EDI and Excell Nano NF products in the Asia-Pacific region, aiming to provide comprehensive, timely, and convenient face-to-face services from the original manufacturer to a wide range of customers.

Brand Development History
品牌发展历程



Global Business Distribution
全球业务分布

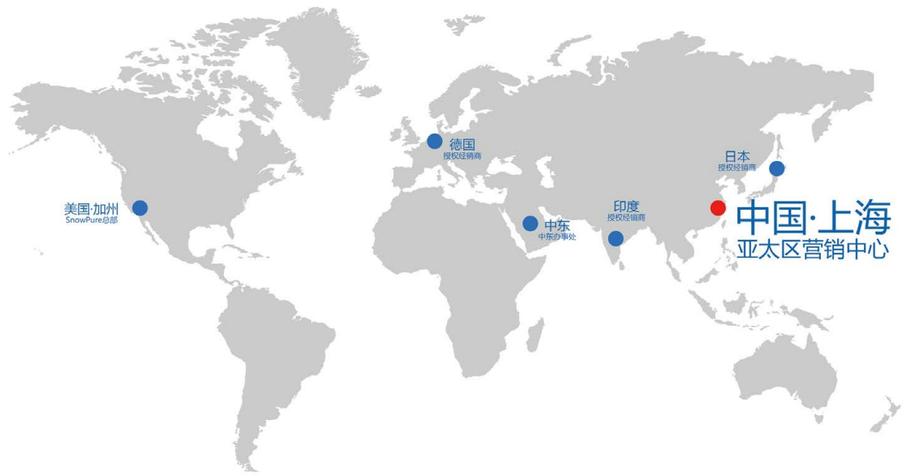
1977 全球第一台EDI

40+ 专注EDI技术研究与应用

HOH 源自美国

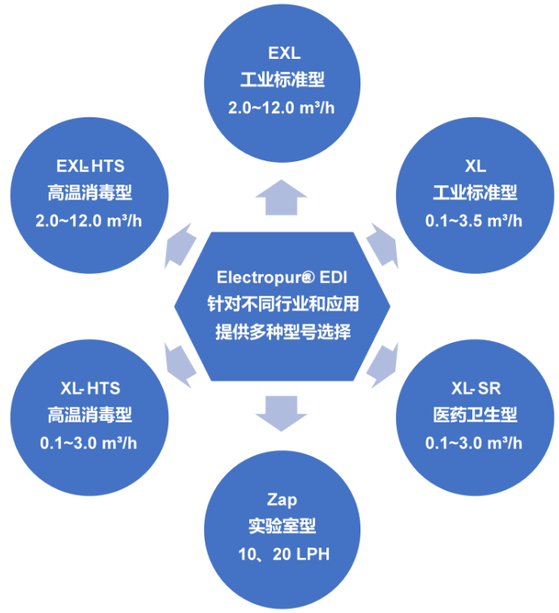
70+ 覆盖全球超75个国家和地区

1000+ 千余套系统安全稳定运行



Product Description
产品介绍

Electropure EDI 完整产品线
Electropure EDI Complete Product Line



Electropure® EDI 拥有针对不同行业和应用的完整产品线。
Electropure® EDI offers a complete product line tailored for various industries and applications.

Electropure®工业标准型EDI

Electropure® Industry Standard EDI

Electropure® EDI工业标准型广泛应用于大型除盐水、锅炉补给水以及电子半导体超纯水等领域，产水量大，水质优异，连续运行、自动化程度高，无需化学品再生、环保节能。

The Electropure® EDI industrial standard model is widely used in large-scale desalinated water, boiler makeup water, and ultra-pure water for electronics and semiconductors, featuring high water production, excellent water quality, continuous operation, and high automation without the need for chemical regeneration, making it environmentally friendly and energy-efficient.

Electropure®高温消毒型EDI

Electropure® High Temperature Sterilizable EDI

Electropure® EDI高温消毒型广泛应用在生物制药领域，该系列型号产品符合美国FDA标准，采用专用高温材料，消毒温度可达85℃，拥有瞬间升温降温技术、消毒更快，消毒次数可达160次，经久耐用。

The Electropure® EDI high-temperature sterilization model is extensively used in the biopharmaceutical field, meeting FDA standards with specialized high-temperature materials, capable of sterilization at temperatures up to 85°C. It features rapid heating and cooling technology, allowing for faster sterilization with up to 160 cycles, ensuring durability.

Electropure®医药卫生型EDI

Electropure® Medical and Health EDI

Electropure® EDI医药卫生型，该型号系列产品和水接触的部件均才采用卫生型，用于生产USP　　纯化水。USP 现已在WHO 世界卫生组织的统一下形成了多个标准的联盟：国际药典。在任何一个USP　　水处理系统中，EDI 都可以作为首选的工艺单元。

The Electropure® EDI pharmaceutical hygiene model includes sanitary components in contact with water, designed for producing USP purified water. USP has established multiple standard alliances under the WHO, forming the International Pharmacopoeia. In any USP water treatment system, EDI is the preferred process unit.

Electropure® Zap实验室型EDI

Electropure® Zap Lab EDI

Electropure® EDI Zap实验室型专为是小型台面或壁挂式实验室去离子水产品设计，用于生产ASTM I型和II型或JIS A2至A4 超纯水。

The Electropure® EDI Zap laboratory model is specifically designed for small countertop or wall-mounted laboratory deionized water applications, producing ASTM Type I and II or JIS A2 to A4 ultra-pure water.

Case Showcase
案例展示

江苏某炼化一体化工程
Integrated Refining and Chemical Engineering Project in Jiangsu

案例简介：
该工程采用“超滤 +2 级 RO+EDI”工艺，产水量高达约 4000t/h，是全球石化炼化和热电行业中采用全膜法工艺制备除盐水水量最大的单期项目。项目原水为工业水，使用 EXL-850 模块超过 500 台，单台模块产水量高达 8 m^3/h，从 2021 年开始模块陆续投运，系统运行至今可靠稳定。

Case Summary:
This project employs the "Ultrafiltration + 2-stage RO + EDI" process, achieving a water production capacity of approximately 4000 t/h. It is the largest single-phase project in the global petrochemical refining and thermal power industries using a fully membrane-based process for demineralized water production. The raw water for the project is industrial water, utilizing over 500 EXL-850 modules, with a single module water production capacity of up to 8 m^3/h. The modules have been gradually put into operation since 2021, and the system has been reliable and stable ever since.

企业名称 COMPANY NAME	上海达格水务有限公司 Shanghai Dagua Water Service Co., Ltd
联系人姓名 CONTACT NAME	徐也驰 XU YECHI
联系手机 CONTACT CELL PHONE	199-4626-6437
联系邮箱 CONTACT EMAIL	daguaasia@163.com
企业网址 COMPANY WEB	www.daguaasia.com

企业介绍
COMPANY PROFILE

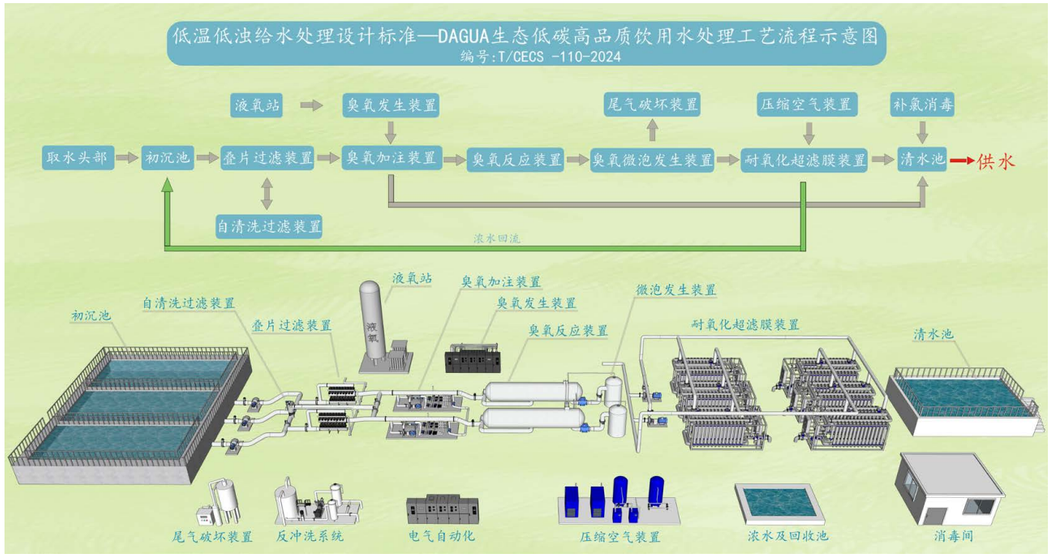
达格水务——引领高品质生态饮用水新时代
上海达格水务有限公司与中方控股的合资公司江苏达格水务有限公司共同组建成立了达格水务全国营销市场总部，坐落于上海市宝山区南蕴藻路 669 号。作为全国乃至全球“DAGUA 工艺”的推广者，达格水务致力于让全球人民都能喝上高品质生态饮用水。
2016 年，达格水务引进了加拿大麦吉尔大学的国际发明工艺专利——“DAGUA 高品质生态饮用水处理工艺技术”。通过引进、消化和再研发，公司掌握了这一工艺的核心技术，即“臭氧压力氧化嫁接耐氧化超滤膜耦合臭氧纳米微泡连续在线清洗及消毒膜”。此技术在 2016 年被国际水协会（IWA）列为饮用水处理重点推广的新工艺技术；2017 年被列入国家十三五重大科技水专项项目 - 饮用水专项；2020 年被水利部列为创新型原生态饮用水处理成熟适用工艺技术并已颁布实施；2024 年被列入升级版低温低浊给水处理工程设计标准，已在全国多家设计院开始规模化设计应用。
目前，达格水务的销售网络已逐步覆盖全球各大区域。未来，达格水务将继续推动技术创新，提升饮用水质量，力争成为全球饮用水处理领域的引领者。

DAGUA 达格水务

企业介绍
COMPANY PROFILE

DAGUA Water—Leading the New Era of High-Quality Ecological Drinking Water
Shanghai DAGUA Water Co., Ltd., in partnership with China Holdings' joint venture Jiangsu DAGUA Water Co., Ltd., has established the DAGUA Water National Marketing Headquarters. Located at 669 Nanyunzao Road, Baoshan District, Shanghai, the headquarters is dedicated to promoting the "DAGUA Process" nationwide and globally, striving to provide high-quality ecological drinking water to people worldwide.
In 2016, DAGUA Water introduced the internationally patented "DAGUA High-Quality Ecological Drinking Water Treatment Process" from McGill University, Canada. Through introduction, digestion, and redevelopment, the company mastered the core technology of this process, namely the "ozone pressure oxidation coupled with an oxidation-resistant ultrafiltration membrane and ozone nanobubble continuous online cleaning and disinfection membrane." This technology was listed as a key new drinking water treatment process by the International Water Association (IWA) in 2016; included in the National 13th Five-Year Major Science and Technology Water Project—Drinking Water Special Project in 2017; recognized by the Ministry of Water Resources as an innovative, mature, and applicable technology for original ecological drinking water treatment and implemented in 2020; and included in the upgraded low-temperature, low-turbidity water supply treatment engineering design standards in 2024, with large-scale design applications beginning in many design institutes nationwide.
Currently, DAGUA Water's sales network is gradually covering major regions across the country. Looking ahead, DAGUA Water will continue to drive technological innovation, improve drinking water quality, and strive to become a leader in the global drinking water treatment field.

Product Description
产品介绍

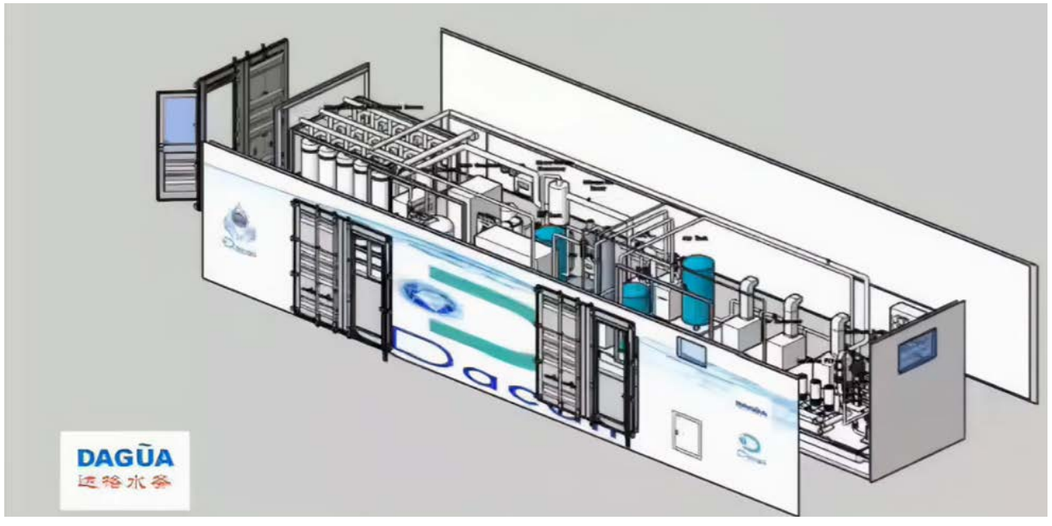


达格工艺较常规传统净水处理工艺，在运行试水过程中不需要添加任何水处理药剂，而且无任何化学污水及化学污泥产生。经取水至初沉池，经过初沉池自然沉淀后进入不锈钢配水水箱，再由不锈钢提升泵提升到叠片自动过滤器，叠片过滤器精度200微米。经叠片过滤器过滤去除原水中较大颗粒杂质，保护后续工艺装备及超滤膜的运行安全。叠片过滤器的出水，其中85%至百分之90部分直接进入臭氧混合装置，另外10%-15%的出水由不锈钢增压泵增压后与文丘里吸附高浓度臭氧。经过臭氧加注，再和85%-90%主水通过管道臭氧混合装置进行迅速混合，混合好后的水带压进入臭氧反应装置，在臭氧反应装置中。迅速氧化分解水中的可溶性有机物，消除藻类，将可溶性铁、锰离子氧化成不可溶的氧化状态，从而去除色度，去除病毒、细菌和大肠杆菌及嗅味。等经臭氧反应装置强氧化处理的出水进入臭氧微泡反应设备。另外设置臭氧透气装置，去除部分游离臭氧后进入耐强氧化超滤膜环境。耐氧化超滤膜孔径范围大致在0.01至0.1微米之间，以压力差为推动力，利用膜的透过性能分离水中离子分子。以及某种微粒，经耐氧化超滤膜装置过滤后的水质已达97项生活饮用水卫生指标和30多项直饮水指标，最终进入清水池加氯后。供给千家万户。

Compared to conventional traditional water treatment processes, the dagua process does not require the addition of any water treatment chemicals during test runs, and it does not produce any chemical wastewater or chemical sludge. After the water is drawn into the primary sedimentation tank, it undergoes natural sedimentation before entering a stainless-steel distribution tank. From there, it is lifted by a stainless-steel pump to the automatic disc filter, which has a filtration precision of 200 microns. The disc filter removes larger particles from the raw water, ensuring the safety of subsequent processes and ultrafiltration membranes.

Of the water exiting the disc filter, 85% to 90% flows directly into the ozone mixing device, while 10% to 15% is pressurized by a stainless-steel booster pump and mixed with high-concentration ozone through a Venturi injector. The ozonated water is then rapidly mixed with the main stream of water (85%-90%) via the pipeline ozone mixing device. The mixed water enters the ozone reaction unit under pressure, where soluble organic matter is rapidly oxidized and decomposed, algae are eliminated, and soluble iron and manganese ions are oxidized into insoluble forms, thereby removing color, viruses, bacteria, E. coli, and odors.

The water treated through strong oxidation in the ozone reaction unit is then sent to the ozone microbubble reaction device. An ozone ventilation system is also installed to remove some free ozone before the water enters an environment suitable for a highly oxidative ultrafiltration membrane. The pore size of the ultrafiltration membrane ranges from approximately 0.01 to 0.1 microns. Driven by pressure differences, the membrane's filtration capabilities separate ions and molecules in the water. After passing through the oxidative-resistant ultrafiltration membrane, the water meets 97 health indicators for drinking water and over 30 direct drinking water standards, and finally enters a clean water tank for chlorination before being supplied to households.



DAGUA原生态净水处理技术是通过臭氧强氧化和耐强氧化超滤膜过滤技术结合的新型水处理技术，系统运行过程中不需要添加任何水处理药剂，通过超细精度叠片式机械自清洗预过滤、臭氧强氧化、耐强氧化超滤膜过滤，达到对水中色度、悬浮物、有机物等的去除。

DAGUA工艺特点如下：

（1）DAGUA水处理系统采用超强臭氧强氧化+耐氧化超滤相结合的短流程处理工艺，特定条件下可替代现有国内外常规（强化）+深度处理工艺。

（2）DAGUA水处理系统运行过程中不需要添加任何化学药剂，出水水质健康原生态。

（3）DAGUA水处理系统中的超滤膜工艺过程能有效去除包括隐孢子虫、贾第鞭毛虫、细菌和病毒等

在内的微生物，显著提高饮用水的微生物安全性。

（4）DAGUA水处理系统针对超滤膜对于溶解性有机物去除能力较弱的缺点，为进一步减少溶解性有机物，采用臭氧作为强氧化剂和消毒剂，可以氧化可溶性有机及无机污染物（氨氮，THM等三致前驱物，氰化物，农药残留物和铁锰），促进悬浮颗粒与胶体颗粒的絮凝，并改善出水水质的口感（大幅降低色度，浊度和消除臭味）。

（5）由于藻类、细菌和病毒等在内的微生物得以有效去除，可减少消毒剂的投加，降低消毒副产物生成。

（6）DAGUA水处理系统的耐氧化超滤膜运行中采用专有的臭氧微泡技术，可实现连续自动清洗、防止生物污染，减缓结垢，减少化学清洗的频率，大幅延长超滤膜的使用寿命（可稳定运行15年以上）。

（7）DAGUA水处理系统可达到全自动智能化运行，可直接通过互联网监控，运行操作管理便捷。

（8）处理设施占地面积小，建设周期快。

Overview of DAGUA Ecological Water Purification Technology

DAGUA ecological water purification technology is a novel water treatment process that combines strong ozone oxidation with oxidative-resistant ultrafiltration membrane filtration. During system operation, no water treatment chemicals are needed. The technology employs ultra-precision disc-type mechanical self-cleaning pre-filtration, strong ozone oxidation, and oxidative-resistant ultrafiltration membrane filtration to remove color, suspended solids, and organic matter from the water.

The main features of DAGUA ecological water purification technology are as follows:

1.The DAGUA water treatment system utilizes a short-process treatment method that combines strong ozone oxidation with oxidative-resistant ultrafiltration. Under specific conditions, it can replace conventional (enhanced) and advanced treatment processes both domestically and internationally.

2.The DAGUA water treatment system does not require any chemical additives during operation, ensuring that the treated water remains healthy and in its natural state.

3.The ultrafiltration membrane process in the DAGUA water treatment system effectively removes microorganisms such as Cryptosporidium, Giardia, bacteria, and viruses, significantly improving the microbiological safety of drinking water.

4.To address the limitation of ultrafiltration membranes in removing dissolved organic matter, the DAGUA system uses ozone as a strong oxidant and disinfectant. Ozone oxidizes soluble organic and inorganic pollutants (such as ammonia nitrogen, THM precursors, cyanides, pesticide residues, and iron/manganese), promotes the coagulation of suspended particles and colloids, and improves the taste of the treated water by significantly reducing color, turbidity, and odor.

5.With effective removal of microorganisms like algae, bacteria, and viruses, the system reduces the need for disinfectant dosing and minimizes the formation of disinfection by-products.

6.The oxidative-resistant ultrafiltration membranes in the DAGUA system incorporate proprietary ozone microbubble technology, enabling continuous automatic cleaning, preventing biological fouling, reducing scaling, and lowering the frequency of chemical cleaning. This significantly extends the lifespan of the ultrafiltration membranes, which can remain in stable operation for over 15 years.

7.The DAGUA water treatment system is fully automated and intelligent, allowing remote monitoring via the internet, making operation and management convenient.

8.The treatment facilities require a small footprint and have a fast construction cycle.

1.超滤膜稳定截留悬浮物，浊度0.1NTU左右。臭氧微泡的生成及饱和水在超滤膜表面破裂可有效控制膜污染，实现连续在线机械清洗及消毒超滤膜，24-36个月清洗一次，延长膜的生命周期达20年以上。

2.利用系统其他膜组件出水的自压实现内源气水反冲洗，也可选择外源反冲洗。

3.耐氧化超滤膜材质可为陶瓷膜、热发PVDF、PTFE、PTFE复合PVDF等。

4.含有残余臭氧的超滤膜浓水回流至原水端实现预臭氧化。因为水中的有机物和病原体被臭氧分解氧化所以反冲洗泥水呈惰性状态，可以直排或干化处理。

5.超滤膜清洗：臭氧微泡含有90%的纯氧和10%臭氧，产生几万个氧气泡及臭氧泡对膜机械连续在线清洗及消毒。大量超氧微纳米气泡在水中溶解、破裂时，当量超声波状态下相当于3000-5000个大气压，产生约5500℃的瞬间高温，同时伴随产生约每小时400公里的超声波，并产生大量的氧负离子和羟基自中基等，将有机物氧化为无机物后去除，每1小时左右一次完成气水反冲洗，含有性污染物排出。

1.The ultrafiltralion membrane stably retains suspended solids, ensuring that turbidity in produced water remains around 0.2 NTu, Thegeneration of ozone micro-bubbles and rupture of saturated water on the surface of the ultrafiltration membrane efectively controlsmembrane fouling while enabling continuous mechanical cleaning and disinfection without frequent chemical cleaning; only requiringcleaning once every 24-36 months to extend its lifespan beyond 15 years.

2.intemal gas-water backwashing is achieved through sel-pressure using other components wthin the system or extemnal backwashincas an alternative option.

3.Oxidation-resistant uitrafiltration membranes are availalble in various materials such as ceramic membranes, thermally-induced PVDr(Polyvinylidene fluoride), PTFE (Polytetrafluoroethylene), PTFE composite PVDF etc.

4.The concentrated water containing residual ozone from the ultrafitraion membrane is recycled back to the raw water end for pre-ozoneoxidation. As organic substances and pathogens in the water are decomposed and oxidized by ozone, the resuling backwash sludgetakes on a flocculent state that can be directly discharged or subjected to drying treatment.

5.Cleaning oxidaion-resistant ultrafiltration membrane: Ozone micro-bubbles contain 90% pure oxygen and 10% ozone, generatingthousands of oxygen bubbles and ozone bubbles for continuous mechanical cleaning and disinfection of the membrane. When a largeamount of superoxide nano-bubbles dissolve and rupture in water, it is equivalent to 3000-5000 atmospheres under the condlition ofequivalent ultrasound, generating an instantaneous high temperature of about 5500'c. At the same time, it produces a large number ofultrasonic waves at a speed of approximately 400 kilometers per hour every hour, as well as abundant oxygen negative ions and hydroxyradicals, which oxidize dificult-to-degrade organic substances into inorganic substances to achieve the purpose of removing pollutants.A gas-water backwash is completed approximately once every hour, discharging trace amounts of ozone-contaminated polutants.

AQUA TECHNOLOGY

1.氧化部分有机物及无机物，促进悬浮颗粒与胶体颗粒絮凝，改善水的味道、色度和气味感官特性。
2.活性高，能够杀死病原体包括病毒，细菌，去除鞭毛虫和隐孢子虫等原生物，减少消毒副产物的浓度，进而防止二次消毒过程产生更多消毒副产物。水中的藻类，压力臭氧快速氧化能迅速令其失活，失活后藻类被超滤膜拦截，臭氧微泡连续在线清洗及消毒，在反冲洗时排出系统。
3.小分子有机物直接氧化成二氧化碳和水以及少量硫酸根和硝酸根离子。
4.通过加成不饱和键，压力快速氧化破坏功能性官能团实现快速脱色，去除水中农药、化肥、抗生素等残留物及新型污染物，消除土嗅素，2-甲基异莰醇等臭味物质，无化学污水及化学污泥产生。
5.臭氧压力氧化后，不饱和气水迅速分离处理系统，确保工艺系统运行安全。
1.Ozone can efficiently remove most oraanic pollutants as well as some inoraanic pollutants throuahoxidation reactions while promoting the aggregation of suspended particles with colloid particles. it alsoimproves sensory characteristics such as turbidity, taste, color and odor.
2.Ozone exhibits high reactivitly which enables it to eliminate pathogens including virus, 2bacteria, reliably removing flagellatescryptosporidiums, and significantly reduces concentrations of major disinfection by-products, This prevents further production of theseharmful substances during secondary disinfection processes.
3.molecules are oxidized directly into carbon dioxide and water along with a small quantity of sulfate and nitrate ions.
4.Through addiion reactions on unsaturated bonds under high pressure conditions, rapid oxidaion occurs which destroys functionagroups resulting in fast decolorization while removing organic compounds effectively from water. This process efficiently eliminatesresidual pesticides, fertlizers, antibiotics as well as emercing polutants present in trace amounts. Additionally it eradicates odoroussubstances such as aeosmin and 2-methvlisobomeol without producing any chemical wastewater or sludge.
5.Following ozone pressure oxidation treatment quickly separates unsaturated gas-water to guarantee safe operaion of the processingsystem.

Case Showcase
案例展示

西峡地下生态水厂
Xixia Underground Ecological Water Treatment Plant

西峡水厂位于河南省南阳市西峡县创业家园西北150米，西峡景观地下水厂日出水量为30000吨/天，工程采用技术先进的达格DAGUA原生态净水处理工艺。
DAGUA的创新型原生态净水处理技术，是通过臭氧强氧化组合创新技术和耐强氧化超滤膜技术相结合，较传统净水厂工艺在运行制水过程中不需要添加任何水处理药剂，而且无任何化学污泥产生。超滤膜清洗采用连续自动臭氧微泡技术结合气水反冲洗（不使用化学试剂）。
原水从灌河取水至初沉池，经过初沉池自然沉淀后进入不锈钢水箱，再由3台（2用1备）的提升泵提升到叠片自动过滤器（自清洗过滤器），经叠片过滤器过滤去除原水中较大颗粒杂质，保护后续超滤膜的运行。
叠片过滤器其中15%的产水由增压泵增压后与高浓度臭氧通过臭氧加注、臭氧混合装置进行迅速混合，混合后的水带压进入臭氧反应器。在臭氧反应器中迅速氧化分解水中的可溶性有机物，消除藻类，将可溶性铁、锰离子氧化成不可溶的氧化状态，从而去除色度、去除病毒、细菌和大肠杆菌及嗅味等。且臭氧能将水中本来对超滤膜有污染作用的有机物(腐殖酸)分解成不易污染膜的、更分散的物质，减缓膜污染，并使膜表面的污染层在反冲洗过程中更容易被去除。
经臭氧反应罐强氧化处理后的出水通过臭氧微泡发生装置（对后续膜装置进行连续清洗，防止膜污染）及臭氧脱气装置（为避免后续臭氧浓度过高对超滤膜损害去除部分游离臭氧）后进入耐强氧化超滤膜装置，超滤技术是一种以压力差为推动力，利用膜的透过性能，达到分离水中离子、分子以及某种微粒为目的的膜分离技术。耐氧化超滤膜的孔径

范围大致在0.01~0.1微米之间。耐强氧化超滤系统采用错流过滤，这样可以避免大量的污染物累积在膜的表面，造成膜的污染，降低过滤性能。经过臭氧反应罐后水中的臭氧可以对超滤膜进行超细微泡清洗，防止结垢。

经耐氧化超滤膜装置过滤后的产水，达标最终进入厂区清水池消毒进行供水；超滤反冲洗水排入排水泵站。

The Xixia Water Treatment Plant is located 150 meters northwest of Chuangye Jiayuan in Xixia County, Nanyang City, Henan Province. The scenic underground water treatment facility in Xixia has a daily output capacity of 30,000 tons, utilizing the advanced DAGUA ecological water purification technology.

DAGUA's innovative ecological water treatment process combines advanced ozone oxidation technology with highly durable ultrafiltration membranes. Unlike conventional water treatment methods, this process requires no chemical additives during water production and generates no chemical sludge. The ultrafiltration membranes are cleaned using a continuous automatic ozone microbubble system combined with air-water backwashing, eliminating the need for chemical agents.

The raw water is sourced from the Guan River and flows into a primary sedimentation tank. After natural sedimentation, it is transferred to a stainless steel tank, and then three (two in operation, one on standby) booster pumps deliver the water to disc-type automatic filters (self-cleaning filters). The disc filters remove larger particles from the raw water, protecting the ultrafiltration membranes downstream.

Fifteen percent of the water output from the disc filters is pressurized by a booster pump and mixed with high-concentration ozone through an ozone injection and mixing system. The pressurized mixture then enters the ozone reactor, where soluble organic matter is rapidly oxidized, algae are eliminated, and soluble iron and manganese ions are converted into insoluble forms, reducing color and removing viruses, bacteria, E. coli, and odors. Additionally, ozone decomposes organic matter like humic acid, which could contaminate the ultrafiltration membranes, into more dispersed particles that are less likely to cause membrane fouling, making the membrane surface easier to clean during backwashing.

After the water undergoes strong oxidation in the ozone reactor, it passes through an ozone microbubble generator, which continuously cleans the subsequent membrane systems to prevent fouling, and through an ozone degassing unit, which removes residual ozone to protect the ultrafiltration membranes. The water then enters the durable ultrafiltration membrane system. Ultrafiltration is a membrane separation technology driven by pressure differences that separates ions, molecules, and particles in the water. The membrane pore size ranges from 0.01 to 0.1 microns. The system employs cross-flow filtration to avoid excessive accumulation of pollutants on the membrane surface, which can degrade filtration performance. The ozone-treated water also helps prevent scaling on the ultrafiltration membranes through microbubble cleaning.

The filtered water meets the required standards and is then disinfected in a clear water tank before being supplied to consumers. Backwash water from the ultrafiltration membranes is directed to a drainage pumping station.

天津逸仙园水厂

Tianjin Yixianyuan Water Plant

逸仙园水厂位于天津市武清区南部天津逸仙科学工业园区内，应用流域：滦河流域，应用水体：滦河水及南水北调水，总占地面积：102.9亩（68616平方米），总建筑面积：10820平方米。该水厂设计总规模为6万m^3/d，分两期建设，一期为3万m^3/d，于1999年左右建成，二期增加到6万m^3/d。

净水厂原有一期工艺流程：引滦水源→调节池→取水口→进水泵房→静态混凝器→反应池→斜管沉淀池→四阀滤池→清水池→吸水井→送水泵房→市政管网。

新建二期工程3万m^3/d，采用DAGUA原生态饮用水处理技术，整个成套工艺设备占地面积少，占地面积不足一千平方；建设工期短，从设计到完工只用了6个月；运行过程中没有化学药剂添加，所以无化多余的学污泥产生，无二次污染。同时采用自动化操作系统，节省大量的人力、物力；目前系统运行稳定，出水经过第三方检测，生活饮用水的106项指标全部合格，浊度小于0.1，水质明显优于一期。

业主评价："经过我们组织华北院等相关的技术部门儿以及我们公司的这个相关的技术专家，对市场进行了调研，我们发现达格公司的这种水处理技术不仅建设周期短，水质效果好，高度自动化，而且呢还能够达到健康水和直饮水的标准"。

The Yixianyuan Water Plant is located in the southern part of Wuqing District, Tianjin, within the Tianjin Yixian Science and Industrial Park. It draws water primarily from the Luan River basin, utilizing both Luan River water and water from the South-to-North Water Diversion Project. The plant covers a total area of 102.9 acres (68,616 square meters), with a total building area of 10,820 square meters. The designed total capacity of the plant is 60,000 m^3/day, divided into two

phases. The first phase, with a capacity of 30,000 m³/day, was completed around 1999. The second phase increased the capacity to 60,000 m³/day.

The original process flow of the first phase included: Luan River source water → regulation reservoir → intake point → intake pump station → static mixer → reaction tank → inclined tube sedimentation tank → four-valve filter tank → clean water tank → suction well → water delivery pump station → municipal pipeline network.

The newly constructed second phase, with a capacity of 30,000 m³/day, adopts DAGUA ecological drinking water treatment technology. This complete set of process equipment requires minimal space, occupying less than 1,000 square meters. The construction period was short, taking only six months from design to completion. During operation, no chemical agents are added, resulting in no chemical sludge generation and no secondary pollution. The plant also uses an automated control system, greatly reducing labor and material costs. The system is currently running stably, and third-party testing shows that all 106 indicators for drinking water quality are compliant, with turbidity less than 0.1 NTU, making the water quality significantly better than that of the first phase.

Owner's Feedback: "After organizing relevant technical departments, including the North China Design Institute and our own technical experts, to conduct market research, we found that DAGUA's water treatment technology not only has a short construction period and delivers excellent water quality, but also offers a high degree of automation. Additionally, it meets the standards for healthy and direct drinking water."

AQUA
TECHNOLOGY

企业名称 COMPANY NAME	**张家港灵英科不锈钢筛板有限公司** Zhangjiagang Linker Stainless Steel Sieve Plate Co.,Ltd.
联系人姓名 CONTACT NAME	**孙永波** SUN YONGBO
联系手机 CONTACT CELL PHONE	189-1567-9828
联系邮箱 CONTACT EMAIL	sales.sun@cnlinker.cn
企业网址 COMPANY WEB	www.cnlinker.cn
企业介绍 COMPANY PROFILE	

我司独家代理销售美国 Tekleen 品牌过滤器。
位于西洛杉矶的心脏地带，Tekleen 自清洗过滤器有限责任公司是公司总部和配送中心，我们的高品质的自动自清洁水过滤器生产线。
凭借世界一流的创新自清洁机制，高性能水过滤器消除了手动清洁的需要。大大减少您的维护时间和成本，并显著地改善水质。
凭借三十多年的经验，我们的团队为全球各种工业、市政和灌溉应用提供了高效、可靠、可持续和经济高效的过滤解决方案。
从过滤器的设计、工程和制造，到技术支持和现场培训，我们与您同在，为您提供专业的客户服务，让您完全放心。

TEKLEEN Automatic Filters, LLC

企业介绍
COMPANY PROFILE

We Linker as an exclusive agent for Tekleen water filters.

Located in the heart of West Los Angeles, Tekleen Automatic Filters LLC is the corporate headquarters and distribution center for our high quality line of automatic self-cleaning water filters.

With a world-class innovative self-cleaning mechanism, high-performance water filters eliminate the need for manual cleaning – drastically reducing your maintenance time and costs, and significantly improving water quality.

With over three decades of experience, our team has provided efficient, reliable, sustainable, and cost-effective filtration solutions for various industrial, municipal, and irrigation applications around the globe.

From filter design, engineering, and fabrication, to technical support, and onsite training, we' re with you every step of way – providing expert customer service and total peace of mind.

Product Description
产品介绍

ABW 系列
ABW Series

ABW 系列：75-∞ GPM，
2-4,000 micron range，40-150 psi.
自动反冲洗，不中断主流，确保水的纯度在不同的应用。高压和高温型号也可根据要求高达600psi和210度。

ABW Series: 75-∞ GPM,
2-4,000 micron range, 40-150 psi.
Automatic backwashing without interrupting the main flow ensures water purity in different applications. High pressure and high temperature models are also available upon request up to 600psi and 210 degrees.

MTF 系列
MTF Series

MTF 系列：65-∞ GPM，
2-4,000 micron range，40-150 psi.
垂直设计适用于空间要求小的应用。

MTF Series: 65-∞ GPM,
2-4,000 micron range, 40-150 psi.
Vertical design is ideal for applications with limited space requirements.

LPF 系列
LPF Series

LPF 系列: 100-∞ GPM，
10-4,000 micron range，15-150 psi.
低压过滤器(LPF)使用低电压，低能耗的电动机来协助自清洁循环，工作压力低至15 psi。

LPF Series: 100-∞ GPM,
10-4,000 micron range, 15-150 psi.
The Low Pressure Filter (LPF) uses a low voltage, low energy motor to assist in the self-cleaning cycle and operates at pressures as low as 15 psi.

CSB 系列
CSB Series

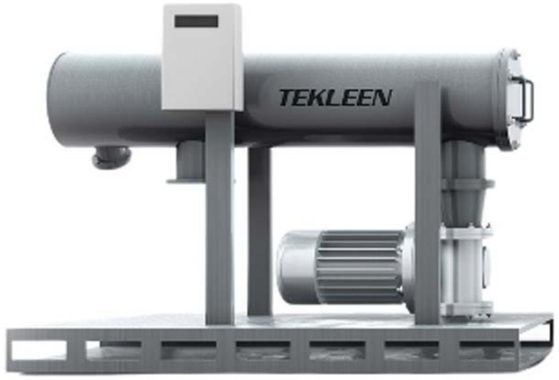
CSB 系列: 紧凑的尺寸与高流量，
CSB过滤器旨在过滤污染物超过500微米，如斑马贻贝，鱼，树叶，蛤蜊等。

CSB Series: Compact size with high flow, CSB filters are designed to filter contaminants over 500 microns such as zebra mussels, fish, leaves, clams, etc.

SKID 系列
SKID Series

Skid 系列: 紧凑, 即时, 一站式过滤解决方案, 简化了安装和维护。
可适用于ABW，MTF和LPF模型。

Skid Series: Compact, instant, one-stop filtration solutions that simplify installation and maintenance.
Available in ABW, MTF and LPF models.



CSF 系列
CSF Series

CSF 系列: 100-∞ GPM,
1/4"-1/2"筛网缝隙，最大压力为150psi。在粗糙水源的许多应用中，清洗是通过以高速切向流量吹出筛网来实现的。通常用作其他Tekleen模型（ABW，MTF，LPF）的初滤器，用于二级过滤。

CSF Series: 100-∞ GPM,
1/4"-1/2" screen gap, 150psi max pressure. In many applications with rough water sources, cleaning is accomplished by blowing out the screen at a high velocity tangential flow. Often used as a prefilter for other Tekleen models (ABW, MTF, LPF) for secondary filtration.

Filter Operations
过滤器操作

我们的全自动和自清洁过滤器仅依靠水压运行，无需手动清洗。有了Tekleen过滤器，在反冲洗周期中，不再需要移除滤芯或中断主流。

正常运行
Normal operation

1 - 进口&粗滤

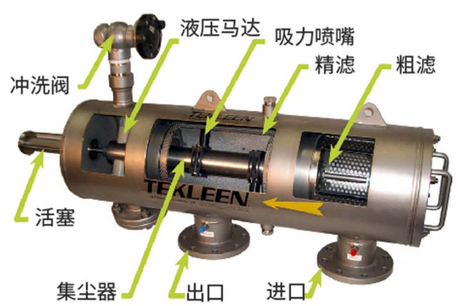
脏水进入过滤器的入口，并通过粗略网。粗筛阻止任何大颗粒通过来保护细筛(精滤)免受损坏。

2 - 精滤

过滤出悬浮颗粒，范围(1000微米到1微米)。

3 - 出口

干净的水通过精滤并从过滤器的出口流出，而污垢颗粒则被留在滤芯的内部。这会导致出口的压力下降，从而启动自清洁循环。



反冲洗循环
Backwash cycle

4 - 冲洗阀

一个信号被发送到电子控制器，它打开冲洗阀进行反冲洗循环。

5 - 吸力喷嘴

喷嘴可以把污物从滤芯内部吸走。

6 - 集尘器

将滤芯内的碎屑通过集尘器转移到液压马达室中。

7 - 液压马达

碎片通过液压马达排出，使集尘器以直线运动旋转。这允许集尘器扫描100%的筛网内部。脏水通过冲洗阀排出。

8 - 活塞

在清洗周期结束时，将集尘器移回其原始位置。

AQUATECH CHINA 2024 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 2024 亚洲水技术展览会将于 2024 年 12 月 11-13 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 2024 will be held from 11 to 13 December 2024 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:

侯女士 Wendy Hou
电话 Phone：+86 21 3336 -713 ext 8056
邮箱 E-mail：w.hou@aquatechexpo.com
网址 Web：www.aquatechexpo.com

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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。

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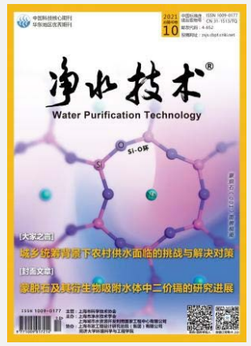

《净水技术》为月刊，被中国科技核心期刊等多个数据库收录，报道领域涉及市政给排水、工业水处理和水环境领域中的新技术与工艺、新材料与设备、新检测方法、创新管理技术及典型工程应用，适读对象包括国内外水务行业相关政府、高校、研究院、设计院、运营单位、工程公司和设备厂商等。

《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。

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