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# Fluence secures substantial contracts in Italy and North America

**Abstract:** Fluence Corp Ltd has been awarded industrial wastewater and biogas contracts in Italy and has secured several other contracts in North America in the municipal market.

The US-based provider of water and wastewater treatment systems reports that it has secured a contract worth US$2.3 million in Italy to provide an aerobic wastewater purification plant for Cartiere di Trevi, rated at 7500 $m^3$ (about 2 million gallons) per day.

The system, which is scheduled to be commissioned in mid-2025, will be used in a mill, located in Trevi, for recycled paper that produces up to 240 tons of cardboard daily.

In addition, a major food-processing company in northern Italy has purchased a new pretreatment unit from Fluence for US$1.4 million. This includes wastewater accumulation and primary treatment – specifically fine screenings and dissolved air flotation units. Set to be commissioned in late 2024, it will have a capacity of up to 5500 $m^3$ (a little over 1.4 million gallons) per day.

Fluence, which is based Golden Valley, Minnesota, also reports that its Municipal Water & Wastewater group has secured several contracts in North America, with a total value of US$3.3 million – helping it to gain traction in the municipal market in North America.

Two of these orders are a result of penetrating new markets, bringing, for the first time, its membrane aerated biofilm reactor (MABR) technology to Colorado and Indiana.

In Colorado, it has secured a contract to supply an MABR plant to Sagewood Pointe Homeowners Association. The wastewater treatment plant, rated at about 98 000 (26 000 gallons) per day, includes a (12 m) 40 ft equalisation/sludge holding tank (EQ/SST), and Aspiral L3 and Aspiral M0 Plus with UV disinfection. The plant is set to be delivered and commissioned by the end of 2024.

According to Fluence, this win is a result of its MABR technology receiving approval from the Water Quality Control Division of the Department of Public Health and Environment in Colorado.

Fluence has also secured an order for an Aspiral M1+ and an EQ/SST tank for Needmore Elementary School in Bedford, Indiana.

Commenting on these orders, Steven Scheidler, Vice President & General Manager, Municipal Water and Wastewater, Fluence, said: ‘We are pleased to sign these contracts with Sage and Needmore. Biological nutrient removal (BNR) regulations are getting stricter in states across the USA.’

‘Our Aspiral technology provides high nutrient removal using MABR treatment technology’s self-respiring spiral-wound membranes, packaged compactly for quick delivery and easy set-up. These wins open the door for more BNR projects in Colorado, Indiana and other states across the country.’

**For further information, visit:**

www.fluencecorp.com

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# Cerafiltec technology features in MBR projects on four continents

**Abstract:** Cerafiltec has secured membrane bioreactor (MBR) projects in four regions across the world – highlighting the global market's growing appreciation for the advantages of ceramic flat membrane technology.

In February and March 2024 the firm, which specialises in ceramic flat membrane (CFM) technology, secured four MBR projects, with a combined capacity of 13.7 million litres (3.6 million gallons) per day.

It says this achievement underscores the growing demand for robust membrane products across a spectrum of water and wastewater treatment applications.

Particularly when dealing with MBR projects, challenges such as sludge clogging and fibre breakages can impact budgets and operations heavily. Cerafiltec claims that the reliability, robustness and cost-effectiveness of its technology were key factors in the decision to choose its membranes.

Located in Italy, Mexico, the United Arab Emirates and Africa, the projects range from an industrial MBR rated at 250 $m^3$ (66 000 gallons) per day to a municipal MBR with a capacity of 10 000 $m^3$ (about 2.7 million gallons) per day.

These projects involve replacing polymeric membranes – hollow fibre and flat sheet – with the firm's CFM technology and upgrading conventional systems to ceramic MBRs. This shift highlights the industry's movement towards more robust and reliable water treatment technologies, unlocking total cost of ownership benefits.

A key reason for choosing ceramic membranes over polymeric membranes in industrial MBRs is to overcome fibre breakages and operational challenges, specifically for water reuse. For municipal MBRs, the decision is driven by the lower total cost of ownership offered by durable ceramic membranes, along with ease of maintenance.

To all projects, the operational flexibility that ceramic flat membranes offer is a significant advantage, says the company.

It is especially their ability to be chemically cleaned without the typical limitations associated with polymeric membranes that drives strong market appetite and value for the operators. This ensures a more efficient maintenance process and reliable operations – which have a positive effect on operational costs.

Kay Gunther Gabriel, Chief Technology Officer, Cerafiltec, commented: 'The successful acquisition of these projects is a clear indicator of the global market's growing appreciation for the advantages of ceramic flat membranes.'

'System integrators and end-users are increasingly recognising the value of products and technology that offer extended lifetimes and reduced maintenance, leading to a superior total cost of ownership.'

Cerafiltec recently inaugurated its new facility in Germany that is dedicated to the research and development, engineering and production of CFMs (*Membrane Technology*, Volume 2023, Issue 4, https://doi.org/10.12968/S0958-2118(23)70033-5).

**For further information, visit:**

www.cerafiltec.com

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# Battery membrane has the potential to extend the cruise range of EVs

**Abstract:** Japan's Toray Industries Inc has developed an ion-conductive polymer membrane for batteries used to power electric vehicles (EVs). Described as innovative, it has the potential to dramatically extend a vehicle's cruise range.

Toray, which also develops membranes for reducing carbon dioxide emissions in hydrogen purification processes, reverse osmosis in the desalination sector and ultrafiltration for water treatment, says that compared with predecessors the polymer membrane is capable of increasing ion conductivity tenfold.

It also could accelerate the deployment of solid-state batteries, air batteries and other lithium metal batteries – greatly expanding the cruising ranges of EVs, industrial drones, urban air mobility systems and other modes of transportation.

A transition to electric mobility is increasing the demand for lithium-ion batteries that deliver higher energy densities. Efforts are under way to develop lithium metal batteries whose anodes enable the highest theoretical energy capacity.

According to Toray, the challenge of lithium metal is its high surface reactivity and the stability issues associated with its dissolution and precipitation morphology during charging and discharging cycles.

It says one notable drawback is the growth of lithium dendrites –branch-like lithium crystals that grow when batteries are being charged. Dendrite growth can degrade battery performance and cause short circuits. Metallic lithium anodes in batteries employing solid electrolytes pose similar hurdles, and have yet to see practical applications.

The polymer membranes that are being development by Toray rely on a mechanism – referred to as "hopping conduction" – that enables lithium ions to traverse between interacting sites within polymer membranes, effectively jumping across sites. The membranes remain non-porous.

The firm says that its expertise in molecular design technology, particularly with aramid (aromatic polyamide) materials – high-performance polymers offering excellent heat resistance and rigidity – has contributed substantially to the development of the ion-conductive polymer membrane.

Toray estimates that enhancing hopping sites and structure, and designing a new polymer with more hopping sites, has delivered the highest ionic conductivity – in the $10^{-4}$ S/cm range – for a hopping-conductive polymer film.

Joint research with Professor Nobuyuki Imanishi of the Graduate School of Engineering at Mie University verified the achievement of 100 charge–discharge cycles for the first time in a dual component lithium-air battery employing this polymer membrane as a separator, says Toray.

The company is planning to accelerate research to swiftly establish technology for use in solid-state, air and other advanced batteries.

**For further information, visit:**

www.toray.com/global/products/films

(Also see the technology focus article entitled 'Toray Industries' membranes play an important role in the battery industry', which was published in *Membrane Technology*, Volume 2023, Issue 2, (https://doi.org/10.12968/S0958-2118(23)70016-5).

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# NX Filtration technology helps produce water for Canadian First Nation community

**Abstract:** NX Filtration is supplying its hollow-fibre nanofiltration (NF) membranes for use in a new water treatment plant in Canada that will serve a First Nation community.

This is the second drinking water project to employ NX Filtration's "direct" nanofiltration (dNF) membranes through Delco Water, a Canadian water treatment systems company and equipment integrator.

NX Filtration, a provider of dNF technology, based in The Netherlands, says that this project seeks to upgrade and extend the water treatment system for a remote community, supplying clean and reliable drinking water produced from lake water with high organics.

The project will have a capacity of approximately 1000 $m^3$ (around 264 000 gallons) per day and is expected to be commissioned at the end of 2024. It is part of a Canadian investment programme for clean drinking water, wastewater and storm-water infrastructure improvements in First Nation communities.

In 2023, NX Filtration supplied NF modules for another drinking water project through Delco Water – for the Mikisew Cree First Nation community in Alberta.

Mark Lewis, Sales Director, Delco Water, commented: 'We are happy to continue working with NX Filtration on these surface-water projects.'

'The company's hollow-fibre nanofiltration technology effectively turns lake water into drinking water in a simple one-step filtration process, with reduced chemical consumption and environmental impact. This not only improves the total cost of ownership, but is also of great importance for managing and supporting the system remotely.'

Jay Garcia, NX Filtration's municipal sales manager in North America added: 'This project, along with many other surface-water projects, are a great fit for dNF technology, which effectively eliminates organics and other contaminants whilst providing the end user with the lowest cost of ownership and strong sustainability benefits.'

'I am proud that NX Filtration and Delco Water are contributing solutions for better drinking water for First Nations communities.'

In 2023 we reported that Spain's Aqualia, which focuses on water cycle management, and NX Filtration, had further extended their working relationship (*Membrane Technology*, Volume 2023, Issue 4, https://doi.org/10.12968/S0958-2118(23)70034-7).

Pilot projects that use technology from NX Filtration are frequently covered in the news we provide. A previously published technology focus article, entitled 'Confirming NX Filtration's NF capabilities using pilot testing', explains how France's Veolia is expanding its pilot testing using NX Filtration's dNF technology, and also briefly looks at some of the pilot programmes run by other companies, that rely on the Dutch firm's membranes (*Membrane Technology*, Volume 2022, Issue 1, https://doi.org/10.12968/S0958-2118(22)70017-1).

**For further information, visit:**

https://nxfiltration.com &

https://delco-water.com

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# Further functions are added to Lanxess' LewaPlus design software

**Abstract:** Lanxess has further enhanced the functionality of its LewaPlus design software. Amongst the additions are functions dedicated to designing new plants and optimising existing ion exchange units, calculating and evaluating mixed-bed systems and determining resin performance in condensate polishing applications.

The German speciality chemicals company reports that it has released a new version of its LewaPlus design software with a significantly expanded range of functions.

The calculation tool, which enables the dimensioning of ion exchange systems, including individual process configurations, has been updated with improvements and additions in the modules for mixed-bed calculation, condensate polishing and the design of polishing stages in food and beverage production.

The software also enables users to check the efficiency of existing systems and identify potential savings in operating costs.

The new functionalities in the water treatment application area include a module for designing mixed-bed systems with ready-to-use mixed bed (MB) resins. The starting point for this was standard mixed beds for which reliable data on operating capacity are available.

The module makes it possible to design the filter hydraulics and enables a good estimate to be made of the expected cycle time. As soon as the database is sufficiently accurate for a realistic calculation of the cycle time, high-end mixed beds also will be integrated in a further update, says the company.

In addition to designing new systems, LewaPlus now also makes it possible to evaluate existing mixed-bed systems, optimise them, and monitor the performance of the installed resins.

The MB-Check module was introduced as a logical next step. It is based on the proven Demi-Check module, an efficient tool for evaluating the performance of systems by simulating ageing of the installed resins or changes in the composition of the feed water.

The further development of LewaPlus ensures a more comprehensive calculation of resin performance, when it comes to condensate polishing. The revision of this module includes a number of key improvements.

In an arrangement consisting of a strong acid cation exchange (SAC) resin and a downstream mixed-bed stage, the cycle times can be calculated separately. Such a configuration is often used if the raw condensate has a high pH value. The SAC stage removes most of the conditioning agent so that the mixed bed can be operated for a much longer time. The cycle time of the SAC stage can be now set individually, independently of the mixed bed.

The volume ratio of SAC and strong base anion exchange (SBA) resin in the mixed bed can be varied in the range from 1:2 to 2:1. This means that the hydraulic requirements, such as compliance with the recommended minimum height or the maximum specific volume load (BV/h), can be met without having to adjust the safety factor.

As reported recently, Lanxess added another function to its LewaPlus design software that is specifically targeted at the food industry. See the technology focus entitled 'Further functionality targeting the food industry is added to versatile ion-exchange engineering tool', *Membrane Technology*, Volume 2023, Issue 6, https://doi.org/10.12968/S0958-2118(23)70057-8.

The company says that for the first time it is now offering a feature within LewaPlus that can be used to estimate the use of mixed-bed ion exchange systems to produce the best possible sugar quality.

Investment costs and potential savings in operating costs also can be identified. The former include the installation of the system and the procurement of ion exchange resins. Operating expenses include the cost of regeneration, and water supply and disposal. With the help of a cost forecast, users can estimate the costs over the planned total operating life of the system (total cost of ownership).

As a design tool for the industrial production of aqueous sugar solutions, the LewaPlus FD module helps to dimension new systems and check existing ones.

To complete the portfolio of ion exchange processes for the food and beverage industry, the company has expanded the existing module for corresponding applications. It is now also possible to design mixed-bed systems that are used in a polishing stage for sugar solutions in the production of high-purity sugar.

**For further information, visit:**

https://lanxess.com/en/Products-and-Solutions/Brands/Lewatit/LewaPlus-Software,

https://lanxess.com/en/Company/Corporate-Structure/Business-Units/Liquid-Purification-Technologies &

http://lanxess.com

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# De Nora technology plays key role in hydrogen production hub

**Abstract:** Technology developed by Italy's Industrie De Nora SpA is set to play an important role in the European project "Crete–Aegan Hydrogen Valley" (CRAVE-H2) that is establishing a hydrogen production hub on the island of Crete.

As a partner in the CRAVE-H2 initiative, the Italian industrial electrochemical processes, and water and wastewater treatment company is supplying the Dragonfly system to produce hydrogen.

CRAVE-H2 aims to establish a production and distribution centre for green hydrogen that will be partly stored and reused in the grid when needed by conversion to electricity via fuel cells and partly used as fuel for local public mobility. The project will be located at the port of Atherinolakkos.

De Nora will provide the latest generation Dragonfly electrolyser to produce more than 500 tons of hydrogen per year – a record production for the island that will facilitate its energy transition.

De Nora says that this project represents a first for the company, in terms of capacity – 4 MW – for the Dragonfly containerised electrolyser.

Within the project, which is co-funded by the European Commission and the Clean Hydrogen Partnership, De Nora will cooperate with other partners involved in the field of renewable energy sources and fuel cells development, and universities in Greece and Italy.

According to the company, Dragonfly stands out because of its compact design and small footprint. It can be adjusted easily for use in industrial settings where a small footprint and full integration with a containerised system is required for in-loco projects for green hydrogen production.

Paolo Dellachà, CEO, Industrie De Nora, commented: 'We enthusiastically announce De Nora's involvement in the CRAVE-H2 project, the second initiative at European level in which we are involved in just a few months, following the partnership within HyTecHeat.'

'The latest generation of containerised electrolyser recently launched on the market represents a cutting-edge asset in the hydrogen value-chain, contributing to the decarbonisation process of several industrial sectors and playing a key role in mobility.'

**For further information, visit:**

www.denora.com

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# Aquaporin provides membranes for innovative water treatment technology project

**Abstract:** Danish water technology company Aquaporin A/S is part of the RESURGENCE project that is aiming to significantly contribute to EU climate neutrality, circularity and competitiveness by exploring synergies between urban water treatment and industrial operations through the use of innovative technology.

The four-year project is funded by Horizon Europe and coordinated by Centro Tecnológico de Investigación Multisectorial (CETIM), and involves a consortium of 20 partners from 11 countries, including international cooperation with Turkey and Pakistan. In addition to expertise on water treatment, Aquaporin is providing membranes for the project.

With a comprehensive approach that integrates efficient technologies and digital systems for water circularity, energy and feedstock recovery for process industries in the EU, RESURGENCE aims to significantly contribute to the region's climate neutrality, circularity and competitiveness.

At Aquaporin, the project will be closely followed by Jörg Vogel, Vice President of Open Innovation.

Vogel commented: 'We have a competent team with a lot of great partners. We are all bringing a lot of industry know-how, and we can develop great, innovative solutions together.'

At the core of RESURGENCE is innovative technology for water treatment, says Aquaporin. These will enhance water quality and facilitate the recovery of energy and valuable feedstocks.

In addition to technological advancements, RESURGENCE will develop and apply digital tools such as energy, water and risk management models, physical and software sensors for data acquisition, digital twins and decision-support tools. These tools will optimise setting up water treatment technology and day-to-day operations.

The project will focus on four case studies spread over Portugal, Turkey, Poland and Spain, encompassing the pulp and paper, chemical and steel sectors.

Vogel continued: 'We are proud to participate in this project and help develop new innovative technology across industries. Water treatment has improved significantly over the years, and implementing technologies like Aquaporin Inside can help the green transition further.'

As reported previously, Aquaporin is working with PUB, Singapore's National Water Agency, on a project that aims to demonstrate the use of a biomimetic RO membrane and its ability to save energy (*Membrane Technology*, Volume 2023, Issue 6, https://doi.org/10.12968/S0958-2118(23)70055-4).

The companies reported that they have formed a partnership to demonstrate, for the first time, the applicability of biomimetic low-energy Aquaporin Inside membrane technology to NEWater – a key component in building a diversified and sustainable water supply for Singapore – producing ultra-clean, high-grade reclaimed water.

**For further information, visit:**

https://aquaporin.com,

https://cetim.es/portfolio-tag/resurgence &

https://www.linkedin.com/company/resurgence-heu/about

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# French bakery reuses wastewater it produces by employing Veolia technology

**Abstract:** In France a company that produces and sells pastries and viennoiseries has formed a partnership with Veolia to meet its wastewater reuse needs at its site in Les Cerqueux.

The manufacturer of baked goods has entrusted Veolia Water STI – the subsidiary a Veolia Environnement SA that specialises in water treatment – with the implementation of a packaged treatment plant to reuse the wastewater it generates. Veolia will also operate it for two years.

The facility, located at the headquarters of Brioche Pasquier in the Pays de la Loire region, enables the manufacturer to be 100% compliant with water quality requirements in the food industry.

Serving as a pilot unit for its other production sites, the water treatment plant is instrumental in the firm meeting its sustainable development goals, limiting its impact on the water resource by significantly reducing its consumption.

Overall, this installation saves 85% of the drinking water used for cooling the factory, which represents 18 000 $m^3$ (around 4.8 million gallons) per year. The treated wastewater that is not recycled in the plant is used for agricultural irrigation.

With a capacity of 3000 litres (793 gallons) per hour, the facility features a customised pretreatment system that uses filtration and a reverse osmosis stage, including a Sirion Advanced Pro that enables high-quality industrial process water to be produced – eliminating up to 98% of dissolved inorganic materials and more than 99% of dissolved organic materials, colloids and particles.

Veolia's patented Hydrex chemicals, specially developed to optimise the performance of utilities and water treatment assets, complete the unit.

**For further information, visit:**

www.veoliawatertechnologies.com

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# SciMed distributes Analytik Jena's TOC and TNB analysers in the UK

**Abstract:** Laboratory instrumentation supplier Scientific & Medical Products (SciMed) has agreed an exclusive deal to distribute Analytik Jena's Multi N/C x300 analyser range in the UK.

The new product series for total organic carbon (TOC) and total bound nitrogen (TNb) analysis offers great flexibility in sample processing applications, says SciMed.

It is applicable to solid or liquid matrices, ultra-pure or particle-rich samples, and can be used in industrial, contract-testing or research laboratory work.

The first instrument in the range, the Multi N/C 3300, is described as all-round analyser that can easily handle either particle-rich, salt-containing or very pure samples with no dilution, by employing a wide-range nondispersive infrared sensor (NDIR) detector.

It uses high-temperature combustion, intelligent rinse parameters and parallel purging analysis to offer versatility in the laboratory at high throughput – with analysis times of 3–5 minutes per replicate.

The N/C 2300 is a more specialist and heavy-duty instrument and it also uses high-temperature combustion for oxidation. It focuses on particle-rich or small volume samples (down to 10 µl) using its direct injection capability.

Finally, the N/C 4300 UV is extremely sensitive and ideal for ultra-pure water analysis using UV digestion at two wavelengths simultaneously for oxidation.

The analysers can manage both vertical and horizontal sample input, for measuring both liquid and solid matrices, respectively.

The latest MultiWin Pro operating software shows all important information at a glance (including live measurement updates) and provides maximum data integrity, including FDA 21 CFR Part 11 compliance.

In-depth analysis insights, audit trails and user management are available at any stage during a sample sequence. A large number of automated self-check functions constantly monitor gas flows, temperatures, enabling worry-free unattended operation at optimal conditions, says SciMed.

**For further information, visit:**

www:www.scimed.co.uk &

www.analytik-jena.com

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# Workshop covers alternative test methods using multivariate spectroscopy

**Abstract:** International standards organisation ASTM International is running a workshop on 17 June 2024, in Austin, Texas, USA, under the theme 'Alternative Test Methods using Multivariate Spectroscopy for Lab and Online Systems'.

The workshop will build on a 2023 seminar presentation reviewing the highlights of the organisation's subcommittee D02.25, key standards maintained by the group, as well as how and where they influence refinery streams and the monitoring of the final product quality.

According to ASTM, formerly known as the American Society for Testing and Materials, it will educate producers, and technology and system developers about building and validating alternative test methods using multivariate spectroscopy with current ASTM documents developed by subcommittees D02.25 and D02.94.

This includes development of multivariate models, determination of outliers, local and general validation, criteria for conformance with 'D8340 Practice for Performance-Based Qualification of Spectroscopic Analyzer Systems', and its development within product specification. Some general examples will be shown and worked through during the workshop.

The event is sponsored by ASTM International's petroleum products and lubricants committee (D02) and will be held in conjunction with the committee's standards development meetings.

Further information about the workshop can be found on the web-site at the address given below.

**For further information, visit:**

https://go.astm.org/alt-test-methods-multivariate-spectroscopy

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