

**Media Release**

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## **Neste, Borealis, Uponor and Wastewise Group enable chemical recycling of hard-to-recycle plastic waste into new high-quality plastic pipes**

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- **First production of cross-linked polyethylene (PEX) pipes based on feedstock from chemically recycled PEX waste**
- **Project demonstrates chemical recycling can process hard-to-recycle waste plastic into high-quality polymer products**
- **Partners to evaluate further cooperation to expand waste material pool as well as recycled volumes**

Neste, Borealis, Uponor and Wastewise have successfully produced pipes made of cross-linked polyethylene (PEX) which was based on feedstock gained from chemically recycled post-industrial waste plastic from PEX pipe production, using an ISCC PLUS certified mass-balancing approach. The partner companies believe this project is among the first implementations of chemical recycling of PEX.

PEX pipes are an important contributor to energy efficient heating and safe plumbing due to their robustness, temperature resistance and longevity, yet the interconnected polymer chains make them nearly impossible to recycle with conventional recycling technologies. The project shows that chemical recycling can close the circularity loop for hard-to-recycle waste plastic, turning it into high-quality polymers feedstock and enabling the consecutive manufacturing of products with quality and properties identical to those in their previous life.

The cooperation sees Wastewise use their novel pyrolysis-based chemical recycling technology to liquefy industrial waste from Uponor's PEX pipe production, breaking the polymers down back into their building blocks, which creates an oil-like recycled intermediate. This liquid is then co-processed in Neste's oil refinery in Porvoo, Finland and upgraded into recycled [Neste RE™](#), a high-quality drop-in feedstock for the production of new polymers. Borealis is feeding this raw material into their steam cracker and consequently polymerizing it into polyethylene as part of the company's [Borcycle™ C](#), chemical recycling portfolio. Finally, Uponor is using the polyethylene to create new PEX pipe systems, which can then be used in the construction sector for heating, plumbing and cooling purposes once more – eligible even for sensitive applications with high requirements, for example those used for drinking water systems. The whole value chain is traceable via ISCC PLUS certified mass-balancing.

"We are very excited about this collaboration as it gives us a head start on our transition to circular materials," says Thomas Fuhr, Chief Technology Officer at Uponor. "PEX is by far the material that has the most versatile application uses, from building water supply systems to efficient radiant heating and cooling systems, thanks to its superior properties for the construction industry. At Uponor we have just celebrated the first 50 years of our PEX piping, and now our new long-term goal is to use 100% of our PEX waste as raw material through closed loop recycling."

"Hard-to-recycle waste plastic as input and high-quality polymers as output are not in contradiction anymore," says John Webster, Global Commercial Director Infrastructure at Borealis. "In fact, we are able to integrate chemically

recycled PEX pipe waste plastic as a raw material into our established manufacturing processes. It doesn't require additional tests, approvals or validation. It's a drop-in solution ready to use even for drinking water applications."

"The successful project demonstrates not only that recycling of PEX is possible via chemical recycling, but it also shows that it's actually possible with high yields: some 80% of the PEX production waste can be added back to the circle," says Kaisa Suvilampi, Managing Director and Partner at Wastewise. "Through our processes, we were able to turn PEX into pyrolysis oil of sufficient quality to use it as input for a refinery, which in turn can process it into a high quality cracker feed. This project strikes certain PEX off from the list of materials giving recyclers a headache."

"The curtain is opening for chemical recycling," added Mercedes Alonso, Executive Vice President Renewable Polymers and Chemicals at Neste. "It will still take time to reach large-scale operations, but this project is providing the blueprint for circular value chains for polymers via chemically recycling. It's pushing the technology from the promise to the delivery phase. Further, it shows the importance of bringing the right partners together to cooperate."

Due to the involved parties' commitment to pushing circular solutions for polymers and the solution's drop-in character, the partners were able to establish the value chain in a rather short period of time. Little more than six months passed between the start of the project and the production of the first pipes made with chemically recycled PEX waste.

The partnership holds potential for further cooperation beyond production waste: The PEX pipes made by Uponor have already been optimized from a resource efficiency point of view by reducing their wall thickness and increasing lifetime. At the end of their long life, mechanical recycling is so far the first recycling option, but it also means downcycling the materials, e.g. into other construction materials or items such as hockey sticks. With chemical recycling, though, the PEX waste pipes can be turned into fully functional PEX pipes again. Moving forward, the partners will evaluate further opportunities for cooperation. Aside from broadening the waste material pool, this may also include higher recycled volumes.

Neste Corporation

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Photo: PEX pipe production at Uponor. Source: Uponor.  
Photo: © Uponor

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**Neste in brief**

Neste (NESTE, Nasdaq Helsinki) creates solutions for combating climate change and accelerating a shift to a circular economy. We refine waste, residues and innovative raw materials into renewable fuels and sustainable feedstock for plastics and other materials. We are the world's leading producer of sustainable aviation fuel and renewable diesel and developing chemical recycling to combat the plastic waste challenge. We aim at helping customers to reduce their greenhouse gas emissions with our renewable and circular solutions by at least 20 million tons annually by 2030. Our ambition is to make the Porvoo oil refinery in Finland the most sustainable refinery in Europe by 2030. We are introducing renewable and recycled raw materials such as liquefied waste plastic as refinery raw materials. We have committed to reaching carbon-neutral production by 2035, and we will reduce the carbon emission intensity of sold products by 50% by 2040. We also have set high standards for biodiversity, human rights and supply chain. We have consistently been included in the Dow Jones Sustainability Indices and the Global 100 list of the world's most sustainable companies. In 2022, Neste's revenue stood at EUR 25.7 billion. Read more: [neste.com](https://www.neste.com)

**About Borealis**

Borealis is one of the world's leading providers of advanced and sustainable polyolefin solutions and a European front-runner in polyolefins recycling. In Europe, we are a market leader in base chemicals and fertilizers. We leverage our polymer expertise and decades of experience to offer value adding, innovative and circular material solutions for key industries such as consumer products, energy, healthcare, infrastructure and mobility.

In re-inventing essentials for sustainable living, we build on our commitment to safety, our people, innovation and technology, and performance excellence. We are accelerating the transformation to a circular economy of polyolefins and expanding our geographical footprint to better serve our customers around the globe.

With head offices in Vienna, Austria, we employ 6,900 employees and operate in over 120 countries. In 2021, we generated total sales of EUR 12.3 billion and a net profit of EUR 1,396 million. OMV, the Austria-based international oil and gas company, owns 75% of our shares, while the remaining 25% is owned by Abu Dhabi National Oil Company, or ADNOC, based in the United Arab Emirates (UAE). We supply services and products to customers around the globe through Borealis and two important joint ventures: Borouge (with ADNOC, headquartered in the UAE); and Baystar™ (with TotalEnergies, based in the US).

[www.borealisgroup.com](https://www.borealisgroup.com) | [www.borealiseverminds.com](https://www.borealiseverminds.com)

**Uponor in brief**

Uponor is one of the leading international providers of solutions that move water for buildings and infrastructure. The company is rethinking water for future generations with its safe drinking water delivery systems, energy-efficient radiant heating and cooling systems, and reliable infrastructure solutions. With a commitment to sustainability and a passion for innovation, Uponor is developing new technologies and systems that enrich people's lives. We help our customers in residential and commercial construction, municipalities and utilities, as well as different industries to work faster and smarter. Uponor employs about 3,900 professionals in 26 countries in Europe and North America and Uponor's products are sold in more than 80 countries. In 2021, Uponor's net sales totalled approximately €1.3 billion. Uponor Corporation is based in Finland and listed on Nasdaq Helsinki.

[www.uponorgroup.com](https://www.uponorgroup.com)

**WasteWise Group in brief**

Wastewise Group Oy is a private circular economy growth company that offers a new sustainable chemical recycling solution for plastic wastes that cannot be mechanically recycled. With our novel pyrolysis technology, we help plastic industry in their transition from fossil economy to a circular economy. We replace plastic waste incineration with our pyrolysis technology and return plastic molecules back to the value chain of plastic production and help our customers to cut their greenhouse gas emissions.

Our production facilities are located in Nokia, Finland. We are a Finnish leader in liquefied waste plastic oil production and our aim is to grow both in domestic and international markets. [www.wastewise.fi](https://www.wastewise.fi)

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