RESEARCH NOTE

GLOBAL WATER
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MARKETS ANALYZED

KEY COVERAGE AREAS

- Water Quality
- Advanced Water Treatment
- Water Policy

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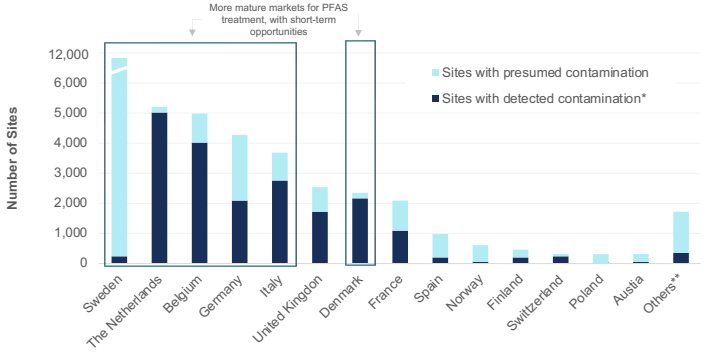
Europe to Ramp up PFAS, Water Regulations

INDUSTRY DEVELOPMENT

On 22 March 2023, the European Union's European Chemical Agency (ECHA) launched a six-month evaluation to review a proposal for restricting the use of per- and polyfluoroalkyl substances (PFAS). The initiative signals the next step toward tighter regulatory enforcement of these contaminants of emerging concern on the continent. PFAS comprise a worldwide group of approximately 10,000 chemicals with a legacy of military, industrial, and commercial applications.

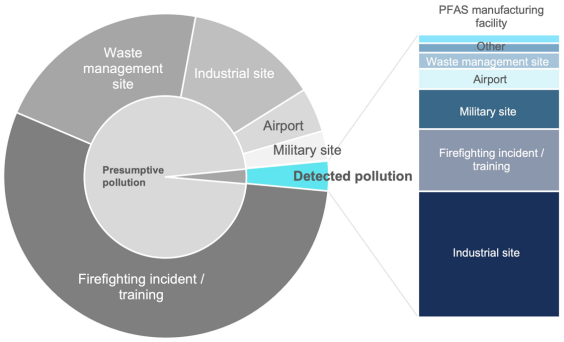
Public concerns in the EU are escalating, and the Forever Pollution Project—a collaboration of journalists and media from across the continent—recently published data identifying over 17,000 contaminated sites and 21,000 locations with presumed PFAS contamination. The implementation of new EU regulations for drinking water expected within the next three years will compel water utilities and stakeholders to make significant investments to remediate PFAS.

Detected and Presumptive PFAS Contamination in Europe, by Country



Note: *Includes specific sites (e.g., airports, military sites) and any other sampled locations
**Countries with <250 identified sites

Site-Specific Contamination, by Share and Type of Site



Source: Forever Pollution Project, Bluefield Research

BLUEFIELD INSIGHTS

EU policymakers look far beyond EU on PFAS regulations. The recent proposal, submitted to the ECHA by Denmark, Sweden, Germany, Norway, and the Netherlands, represents the tightest EU-wide proposal to date on PFAS regulations. It would apply to both the production and usage—direct or indirect—of PFAS in products, including manufactured goods imported into the EU. The document puts forward two regional restriction options:

1. A full ban of PFAS following a transition period of 18 months after adoption, or
2. A full ban with use-specific exemptions for 5 to 12 years, following an 18-month transition period.

Implementation of far-reaching legislation like this proposal is not unprecedented in the EU. On 13 December 2022, the European Council and the European Parliament reached a political agreement on the implementation of the new Carbon Border Adjustment Mechanism (CBAM), which restricts the importation of carbon-intensive products (e.g., cement, iron and steel, aluminum, fertilizers, electricity, and hydrogen). The CBAM will enter into force in its transitional phase on 1 October 2023.

In parallel, EU countries will soon have to comply with revised drinking water standards—specifically, maximum limits of 500 ng/L for total PFAS and 100 ng/L for the sum of 20 specific PFAS. The lack of clarity on funding sources to meet these more stringent parameters, however, will likely place the financial responsibility of remediation on drinking water ratepayers—a direct conflict with the EU's polluter-pays principle.

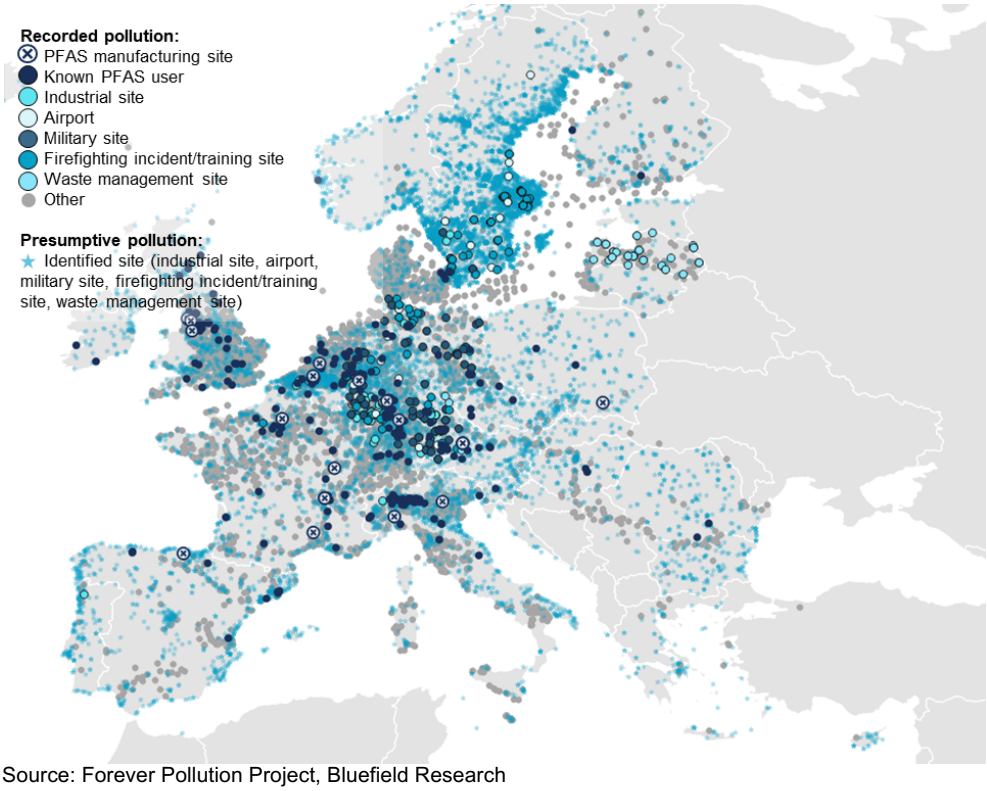
Drinking water drives national PFAS efforts. The decision to implement surveillance of emerging contaminants often stems from recorded or suspected industrial pollution, such as in the DuPont-Chemours Dordrecht facility in the Netherlands, the Miteni Trissino chemical plant in Italy, and the 3M Zwijndrecht plant in Belgium. As a result, select countries have set national or local limits for drinking water, ranging from 100 ng/l in Belgium (all PFAS) to as low as 2 ng/l in Denmark (sum of PFOA, PFOS, PFNA [perfluorononanoic acid], PFHxS [perfluorohexane sulfonate]).

Six countries—Germany, Italy, Sweden,

Denmark, Belgium, and the Netherlands—constitute the most immediate commercial opportunities for drinking water treatment based on the extent of existing contamination, treatment assets, and approaches to PFAS contamination thus far. Together, these countries account for approximately 80.6% of European PFAS contamination sites identified to date and 47.7% of sites with presumed contamination.

Going forward, drinking water treatment activities will continue to focus primarily on areas and regions impacted by direct PFAS contamination. Addressing more indirect pollution incurred by other industrial sites and products (given their ubiquity and diffuseness) will require a greater degree of inventorying and financial investment.

PFAS Contamination Sites in Europe, 2023



Source: Forever Pollution Project, Bluefield Research

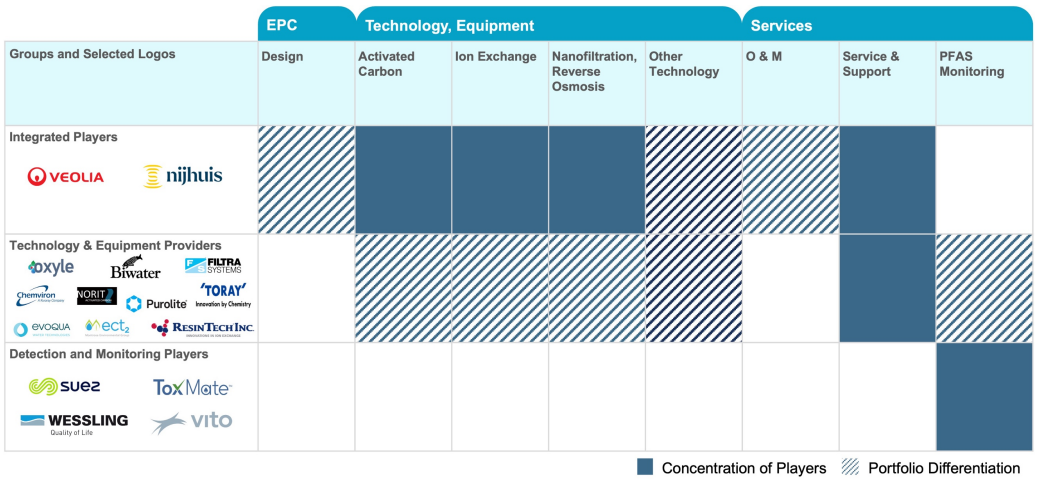
Market opportunities to solidify around integrated players, building on fragmented technology vendors. The growing emphasis on large-scale remediation underpins the deployment of new treatment technologies centered around adsorption or destruction. In the near-to-medium term, the combination of regulatory preferences, asset characteristics, and required pilot-proven commercial viability will keep more mature treatment technologies (namely, activated carbon, ion exchange, and—to a lesser extent—reverse osmosis) at the forefront of the PFAS remediation market.

Vertically integrated and diversified vendors can leverage their technology portfolio offerings to develop references spanning several countries. Some technology firms and suppliers (e.g., Oxyle, Nijhuis) are approaching the municipal water PFAS treatment market by tapping into their existing industrial sector offerings. PFAS detection and monitoring capabilities will continue to serve plant operators in evaluating the extent of contamination and ensuring the efficiency of treatment.

COMPANIES MENTIONED

- 3M
- AquaGreen
- Biwater
- Chemours
- Chemviron
- DuPont
- ect$_2$
- Evoqua
- Fitra Systems
- Miteni
- Nijhuis
- Norit
- Oxyle
- Purolite
- Pyreg
- ResinTech Inc.
- Toray
- ToxMate
- Vito
- Wessling

Current PFAS Drinking Water Removal Value Chain



Source: Companies, Bluefield Research

Biosolids set to emerge as a complex market opportunity. The economic and environmental costs of existing technologies remain an obstacle for PFAS treatment in municipal wastewater. However, removal opportunities exist further down the sludge treatment chain, which could limit the release of compounds to the environment via contaminated waste. To that extent, Denmark, Germany, Austria, Sweden, and Norway have already established guidelines or regulations to set threshold values for PFAS in sludge used for fertilization.

The removal of PFAS in biosolids is done primarily by pyrolysis, an undeveloped market with modest R&D and pilot opportunities in the short term. Indeed, complex processes are required to break down the compounds, which can otherwise vaporize and remain in ashes. Mid- and long-term front-runners for market opportunities include Belgium, Germany, the Netherlands, and Switzerland, given that these countries already use incineration to treat over 75% of their biosolids. Danish company AquaGreen and German company Pyreg have successfully removed PFAS from sludge using pyrolysis at pilots in Fårevejle, Denmark, and Stockholm, Sweden, respectively.