TBIS

Topic of the Speech:
Reinventing Textile Circularity: Scalable Water-Energy Solutions for a Climate-Resilient Industry

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Prof. Muhammad Wakil Shahzad is Chair of Advanced Energy and Sustainability at Northumbria University, UK, and a leading international expert in sustainable water systems, textile wastewater treatment, and circular economy solutions. He is a Royal Academy of Engineering Industrial Fellow and is ranked among the Top 2% of Scientists Worldwide, recognised for delivering impactful, industry-driven innovations addressing global water and climate challenges.

A major focus of his work is transforming the environmental footprint of the textile and fashion industry—one of the largest consumers of water and contributors to industrial pollution globally. Prof. Shahzad leads the FCDO-funded SAFECONOMY (SMEP) programme: "Reinventing the Textile Circular Economy", which develops and deploys advanced solutions for textile wastewater treatment, water reuse, and circular manufacturing systems. His work has demonstrated real-world impact through successful industrial-scale pilot implementation at textile facilities in Pakistan.

At the core of this programme is the development of innovative Molecular Distortion Technology (MDT)-based wastewater treatment systems, capable of treating highly complex textile effluents containing dyes and hazardous chemicals. The technology has achieved over 95% pollutant removal efficiency, enabling compliance with stringent discharge standards and supporting water reuse within industrial operations. This work provides a scalable and transferable solution for major textile-producing regions such as South Asia, where water scarcity and pollution pose critical risks to both industry and communities.

Prof. Shahzad's approach goes beyond technology development, integrating engineering innovation with policy engagement, capacity building, and industry collaboration. The SAFECONOMY project has delivered significant outputs, including 15+ peer-reviewed journal publications, international conference presentations, industry workshops, and training programmes, while also contributing to global policy dialogue. His work has been recognised in international platforms, including UN Water stakeholder engagement processes, reinforcing its relevance to the UN Sustainable Development Goals, particularly SDG 6 (Clean Water), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action).

In addition to his contributions to water systems, Prof. Shahzad is internationally recognised for his work on sustainable cooling and water-energy nexus technologies, including the award-winning S2Cool project. He is also the Founder and CEO of EcoTechX Ltd, a university spinout translating research into deployable solutions for water and cooling challenges in climate-vulnerable regions.

He actively contributes to global research and innovation ecosystems, serving as an evaluator for major funding bodies including ERC, EIC Pathfinder, and UKRI, and engaging with industry, policymakers, and international organisations to accelerate the adoption of sustainable technologies.