



Waste-Energy-Water Nexus: Materials & Processes

VisioNing: valorization of agro-industrial wastewater. From research bench to business.

**K. Rajagopalan¹, E. Falletta^{1,2}, M. Magni^{1,3}, S. Marzorati³, D. Meroni², F. Adani⁴,
C.L. Bianchi²**

¹ *VisioNing srl, via F. Olgiati 26, 20143, Milan, Italy*

² *Department of Chemistry, Università degli Studi di Milano, via C. Golgi, 19, 20133 Milan, Italy*

³ *Department of Environmental Science and Policy, Università degli Studi di Milano, via G. Celoria, 2, 20133 Milan, Italy*

⁴ *Department of Agricultural and Environmental Sciences - Production, Landscape, Agroenergy, Università degli Studi di Milano, via G. Celoria, 2, 20133 Milan, Italy*

kandeeban.rajagopalan@visioning-tech.com

The escalating pollution caused by agro-industrial wastewater is an alarming environmental threat. Apart from the obvious water wastage, valuable nutrients within are also lost [1]. The wastewater treatment sector and that of fertilizers' production account for over 3% and 1.2% of world's energy [2]. Moreover, fertilizer costs are continually growing as they are related to the energy cost and population growth. This represents a significant economic damage to companies in the sector. The agro-industrial wastewater treatment market is witnessing a surge in interest towards efficient and sustainable technologies. In fact, technological innovation and the embrace of eco-friendly solutions are driving industry transformation.

In this context, the mission of VisioNing is simple but ambitious: transforming wastewater from a problem to a resource with 100% circularity and sustainability. VisioNing was conceived after a meticulous examination of the challenges in wastewater treatment. Combining bioelectrochemical and photocatalytic technologies powered by solar energy, our process not only purifies water but also recovers and reuses the nutrients it contains. While numerous wastewater treatment solutions exist, our combined technology offers dual benefits: energy efficiency and recyclability. This empowers us to position ourselves as frontrunners in sustainability and innovation, ensuring a 30% reduction in operational costs compared to traditional systems.

Having conducted in-depth research and developed prototypes at the University of Milan, we have now refined an operational and highly efficient model. A pilot test was conducted with several companies in Lombardy, financed by the "Farming Future" investment fund of CDP Venture Capital SGR and ToSeed & Partners, confirming the preliminary results in terms of nutrients recovery and water purification.

References

[1] J. R. Jones, J. A. Downing, Agriculture. Encyclopedia of Inland Waters 2009, Volume, 225 – 223.

[2] https://www.caprari.com/wp-content/uploads/2023/07/Trattamento_acque-reflue.pdf