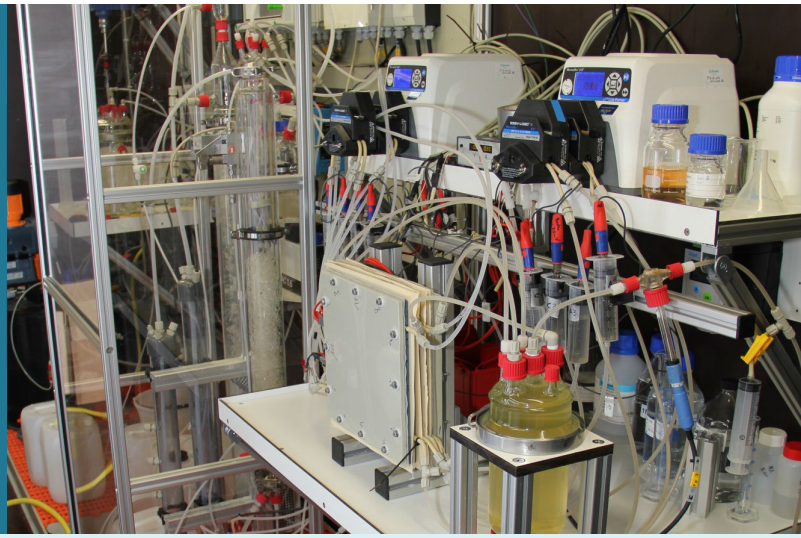
# PROJECT FACTSHEET

www.list.lu/en/research/project/valuefromurine/?no_cache=1&cHash=f37144419fa8b5a57c1999ef50b4d569

## ValueFromUrine

Developing a bio-electrochemical system to recover nutrients from urine at source



In order to ensure sufficient food production, the agricultural industry requires nitrogen and phosphorus fertilizers. Currently, the EU relies on imports of phosphorous ore and the energy intensive production of ammonia to produce these fertilizers, however this is not sustainable. Phosphorus is scarce and non-replaceable, and it is estimated that it could be depleted within 50 to 100 years. Nitrogen can be recovered from nitrogen gas in the atmosphere, but the recovery process is energy intensive and heavily dependent on fossil fuels.

### Context

ValueFromUrine focuses on another potential source of these nutrients: urine. Although making up only 1% of the wastewater produced by an average home, it contributes about 80% of the nitrogen and 50% of the phosphorus. These high concentrations make nutrient recovery from urine a viable option. Research into the separation of urine at its source began in the 1990s and a number of solutions have since been demonstrated. ValueFromUrine looks to develop novel technology that will treat urine before it mixes with other wastewater and recover nutrients through a bio-electrochemical system that uses limited energy.

### Innovation

Running for four years and bringing together seven research organisations, SMEs and industry partners from five countries, including Luxembourg Institute of Science and Technology (LIST), the ValueFromUrine project will develop, optimise and evaluate an innovative bio-electrochemical system that will have the potential to recover more than 95% of the phosphorus and ammonia in urine, while also producing chemicals and energy. The final objective of the project is to demonstrate a prototype able to process 100 L of urine per day.

In the medium term, the full penetration of the technology in the market (as a possible technological answer to the dwindling reserves of phosphorus over the coming years) is likely to be very high, which will make it a breakthrough technology that can generate important benefits in terms of environmental impact avoided. This will be evaluated through the adoption of a fully consequential Life Cycle Assessment (LCA) as well as Life Cycle Costing, led by LIST.

### Impact

The technology developed by ValueFromUrine can lead to greater sustainability by reducing demand for primary raw materials, as urine can provide 18% of the phosphorous and 25% of the nitrogen currently used for soil fertilisation in the EU, reducing the nutrient load sent to wastewater treatment plants, fostering the use of secondary materials for fertilizer production, and promoting more sustainable habits such as reduced water consumption through water-free urinals, decentralised wastewater treatment and increased awareness of the importance of nutrient recovery.

## Partners

Wetsus - European centre of excellence for sustainable water technology (NL) , Magneto Special Anodes BV (NL) , Universidade do Minho (PT) , DESAH BV (NL) , Mast Carbon International LTD (UK) , Abengoa Water (ES)


### Contact

5, avenue des Hauts-Fourneaux
L-4362 Esch-sur-Alzette
phone: +352 275 888 - 1 | LIST.lu




LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY | LIST