

Biological Engineering: Wastewater Innovation at Scale



At BE:WISE Newcastle University and Northumbrian Water Group are transforming wastewater treatment systems at scale.

BE:WISE is:

- accelerating innovation in sustainable wastewater treatment
- experimenting with low-energy biological treatment technologies
- developing low-cost ways to generate energy from waste



BE:WISE

Biological Engineering: Wastewater Innovation at Scale

What is it?

An international centre of research excellence and experimentation for wastewater management technology. BE:WISE is an innovative partnership between Newcastle University and Northumbrian Water Group (NWG).

What is the challenge?

How we treat wastewater in the future is at the centre of global challenges in waste, public health, climate change, clean energy generation and the economy. Wastewater treatment needs to do more at lower cost and with minimal ecological impact.

Why is it important?

Microbes are key to creating sustainable pathways for clean water and sanitation. There are 10^{18} individual bacteria in a treatment plant alone, thousands of species altogether. BE:WISE will make it possible to validate new simulations of how they interact within a treatment plant to bring new technologies forward faster.

- **Speeding up the transition to low-carbon alternatives** for existing energy and chemical intensive treatment processes.
- **Reducing the environmental impacts of wastewater treatment** and deliver sustainable biological treatment processes applied at a range of scales.
- **Knowledge based on sound science** and robust experimentation using real wastewater at a scale that reflects the complexity of wastewater treatment.

Innovating
the future
in wastewater
management



Getting
biology to
do the dirty
work



Why Newcastle University?

Newcastle University has internationally leading research groups in Mathematical Biology, Scalable Computing, Synthetic Biology and Hydrodynamics; all part of BE:WISE.

What is it for?

In collaboration with NWG, the BE:WISE facility is available to academia and industry to deliver world leading research in sustainable wastewater treatment for:

What does BE:WISE offer?

- A world-leading research space that develops novel solutions for sustainable wastewater treatment.
- The ability to reduce the costs and timescales of designing novel biological treatment processes.
- Technologies that harness biology to do most of the work in cleaning wastewater.
- Demonstrations of sustainable approaches to wastewater treatment never tested before.
- Replicate experiments using 10,000 times more microbes than can be used in the laboratory.
- A facility that uses real wastewater from a sewage treatment plant, which receives wastewater from around 30,000 customers of NWG.

Designing
novel biological
treatment
processes



BE:WISE

Working towards Goal 6: Clean Water and Sanitation of the 17 UN Sustainable Development Goals (SDGs).